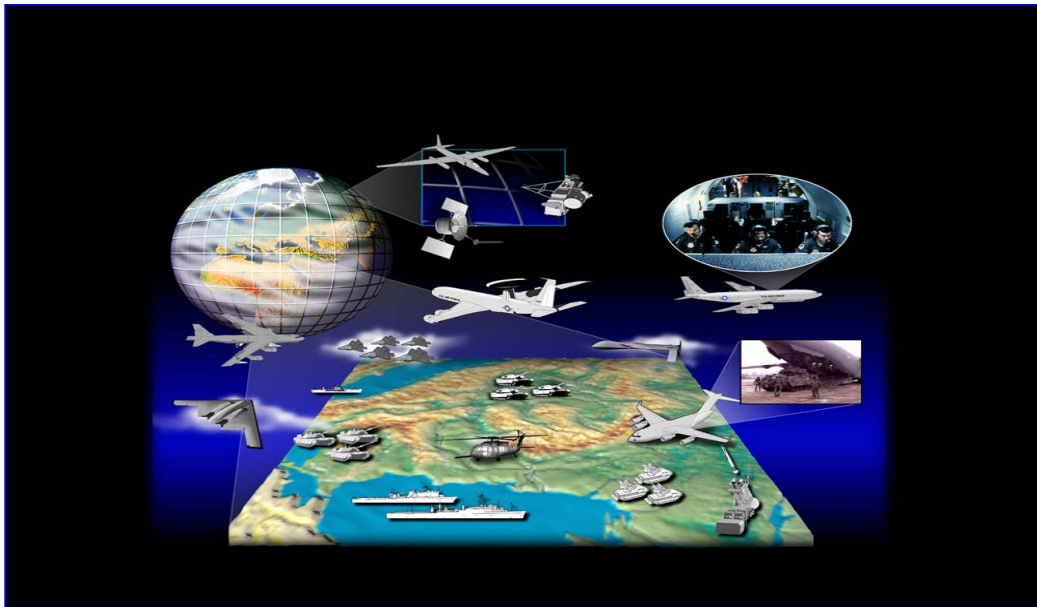


United States Transportation Command's

Transformation Technology Plan



*Leveraging Technology to Enable Synchronized
Deployment, Sustainment and Redeployment*

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Executive Overview

The *Transportation Command (TRANSCOM) Transformation Technology Plan (T3P)* is the command's strategic plan and roadmap for the exploration/exploitation of applied research and technology demonstrations to enhance transportation and distribution processes. Its purpose is to enhance the Defense Transportation System (DTS) and Distribution Process Owner (DPO) capabilities through advancements in state-of-the-art technologies. The USTRANSCOM Science & Technology (S&T) program currently represents a mix of Transformation Technology (TT) funded projects and Research and Development (R&D) funded projects. Starting in FY08, the program will be entirely R&D funded and the program title will convert from the USTRANSCOM S&T Program to the USTRANSCOM R&D Program. The T3P consists of the following chapters:

- I Vision and Mission
- II S&T Program
- III Role of S&T

USTRANSCOM is responsible for worldwide strategic mobility planning and supervises the execution of its DTS and DPO functions through its components. To enhance its operational capabilities, the command requires an integrated S&T strategy that identifies the gaps impinging DTS/DPO capabilities and promotes a process that prioritizes those funding needs in order to achieve a global, networked, integrated and adaptive end-to-end (E2E) rapid deployment/distribution capability. USTRANSCOM must have the processes, automated support tools and interactive/collaborative ability to manipulate transportation and distribution requirements. This includes the capability to perform command and control (C2) operations to collaboratively monitor, assess, analyze, plan, predict, execute, and report business operations while tailoring services to meet customer requirements throughout the process. A description of technology gaps and current S&T investments are located in Appendix A and B respectively.

Our approach is to leverage and integrate the exploration and exploitation of applied research and technology demonstrations to create and implement world-class global deployment and distribution solutions to enhance our nation's transportation and distribution processes and capabilities. We are engaged with leading technology providers across the Department of Defense (DOD) and industry to inform us on sound scientific and engineering strategies USTRANSCOM will champion promising technology solutions for joint utility and benefit through active monitoring of ongoing DOD research and development activities; participating in active technology partnerships with Service, Defense Agency and national laboratories, federally funded R&D centers, as well as industry and academia; encouraging technology transfer/transition and systems integration opportunities at pre-planned product improvement insertion points and incorporating the products of successful deployment and distribution-related research into an integrated solution set to transform global force projection and distribution capabilities.

Reader comments and suggested improvements are welcome. Please forward comments to: TCJ5-AS, USTCJ5-AS@ustranscom.mil, (618) 229-1470.

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Chapter I

Vision and Overall Strategy

The T3P provides an integrated research and development strategy to address Joint Deployment and Distribution Enterprise (JDDE) technology capability gaps. As such, it serves as a critical link with DOD (i.e., Services, Defense Agencies, other Combatant Commands (COCOM), and laboratories) and industry S&T organizations. This plan is based on the command's vision.

Vision

USTRANSCOM's S&T vision, Figure 1, is to provide collaborative and synchronized transportation, distribution, employment, sustainment, and redeployment which makes possible projecting and maintaining national power where needed with the greatest speed and agility, the highest efficiency and the most reliable level of trust and accuracy. Accordingly, USTRANSCOM requires an integrated research, development, test, and evaluation (RDT&E) strategy that not only leverages but also shapes government, commercial and academic community efforts to create and implement world-class global deployment and distribution solutions and connects its customers to the high-tech, high-speed global marketplace.

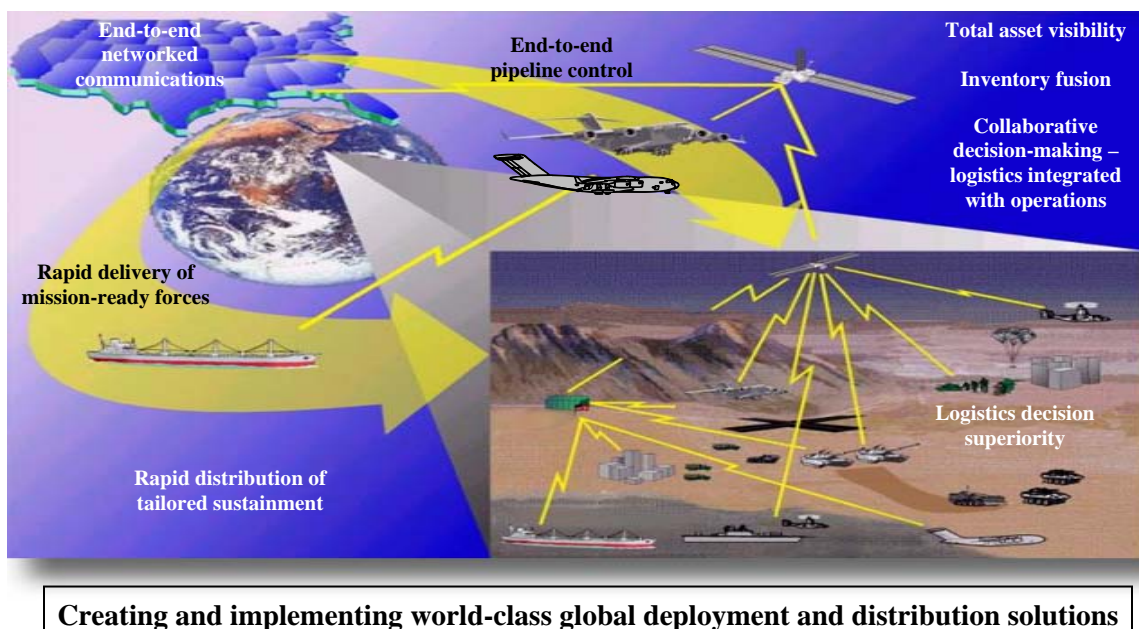


Figure 1

USTRANSCOM's expanded responsibilities for orchestrating transformational changes within the force projection and sustainment processes and systems have introduced operational and technological challenges that expanded the command's original charter. Numerous lessons learned point out the need for a centrally managed S&T effort as the most cost efficient method for transforming DOD's distribution and logistics capabilities to provide required warfighter support. The S&T program will assist USTRANSCOM to mature the distribution management process quickly through a spiral development approach. The highest priority initiatives will:

- **Institutionalize the DPO mandate** by updating UCP language, DOD Directives, and the SECDEF Memo;
- **Develop and operate responsive mobility systems** to support the modular and agile forces of the future with 100% perfect order fulfillment;

- **Manage a streamlined distribution portfolio** for a Joint Deployment and Distribution Architecture that meets warfighters' and other stakeholders' information requirements;
- **Substantially transform the way we work together** by greater consultation and collaboration with JDDE partners;
- **Shape expeditionary tools** for better COCOM support using initiatives like DIRMOB4 and JTF-PO;
- **Adapt our business models** to incorporate outsourcing through activities like the Defense Transportation Coordination Initiative;
- **Ensure an appropriate mix of lift assets** in all domains (air, land, sea).

Over the longer term, USTRANSCOM will pursue strategic opportunities to improve logistics capabilities and support for warfighters. These include initiatives to:

- **Develop joint logisticians** who are trained, experienced, and able to provide optimal deployment and distribution support to warfighters in joint, coalition, and multinational environments;
- **Leverage emerging science and technology applications** to assure superior strategic and tactical mobility support for warfighters; and
- **Support development of a comprehensive financial management system** that captures, validates, and reports reliable, accurate, and timely financial data for decision makers across the enterprise – supporting operational flexibility in planning and execution.

Based on these high-priority initiatives, USTRANSCOM's technology program, through aggressive partnering with its TCCs, government and commercial S&T counterparts, seeks to support a responsive, flexible global power projection and tailored, agile sustainment capabilities that together provide critical deployment and distribution support to the Joint Force Commander, enabling the warfighter the means to dominate the full range of military operations. As the command explores and exploits technologies that support prioritized transformational changes in deployment, distribution, employment, sustainment, and redeployment capabilities, USTRANSCOM intends to use existing processes for identifying distribution process shortfalls and optimize S&T community efforts to address validated capability gaps. Additionally, USTRANSCOM will leverage insights gained through the Joint Exercise Program, Joint Experimentation, Lessons Learned, and ongoing operations as well as future capabilities as defined by the Joint Concept Development documents and the Joint Capability Integration Development System (JCIDS) as valuable insights into shaping the corporate S&T strategy and needs. To better appreciate the role of the S&T community in the emerging vision, it is important to first understand USTRANSCOM's assigned roles/responsibilities and its organization.

Mission

USTRANSCOM leads the JDDE to accurately sense the operating environment, rapidly respond to support joint logistics requirements, and globally project national security capabilities to support the national security strategy. Originally designated as DOD's single manager of the DTS, the Command's mission was expanded by the Secretary of Defense, on 16 September 2003, and codified in the Unified Command Plan, as DOD's single process owner for distribution to better manage the transformation of the E2E distribution process. As the DPO, the Commander serves as DOD's single agent to direct and supervise execution of the strategic and theater distribution system seeking to improve the overall efficiency and interoperability of distribution-related activities: deployment, employment, sustainment, and redeployment. Additionally, USTRANSCOM has been designated as the Distribution Portfolio Manager, responsible for the sub-portfolio of distribution systems in the Business Enterprise Architecture–Logistics (BEA-Log) domain, as well as the Executive Agent for Joint Intermodalism, responsible for facilitating and managing intermodal initiatives. These additional responsibilities charge USTRANSCOM and its TCCs to effectively develop, integrate, and implement flexible logistics architectural and intermodal solutions.

The Joint Warfighter has advocated the Global Combat Support System CINC-129 operational and logistical support requirements to the Services and COCOMs. Globally, USTRANSCOM is the warfighters transportation cornerstone by providing simultaneous force projection and sustainment. The Command is on the leading edge of DOD transformation efforts for a seamless collaborative and synchronized E2E deployment and distribution system providing responsive, exquisite support to the warfighter across the full spectrum of operations. This support is provided by a combination of military (both active and Guard/Reserve) forces and commercial partners, managed through the command's TCCs – the Air Force' Air Mobility Command, the Navy's Military Sealift Command, and the Army's Military Surface Deployment and Distribution Command.

Air Mobility Command (AMC)

AMC provides strategic and tactical airlift, air refueling, Base opening, and aeromedical evacuation services deploying, employing, sustainment, and redeployment of U.S. forces wherever they are needed. AMC is also the worldwide aerial port manager, and where designated, operator of common-user aerial ports. Many special duty and operational support aircraft are also assigned to AMC (including Air Force One). As the single point of contact with the commercial airline industry, the command contracts with commercial carriers for the movement of DOD passengers and cargo. The *Air Mobility Master Plan* (AMMP) contains AMC's Future Technology Roadmap which provides a 25-year vision of technological insertion into AMC. Research for this roadmap continuously pulses industry and laboratories for new technological developments and the maturation of advanced technology to keep AMC on the forefront of the technical curve.

Military Sealift Command (MSC)

MSC provides common-user and exclusive-use sealift transportation services to deploy, sustain and redeploy U.S. forces around the globe principally moving unit equipment. MSC provides sealift with a fleet of government-owned and chartered ships. Additionally, MSC operates a fleet of pre-positioned ships strategically placed around the world and loaded with equipment and supplies to sustain Army, Navy, Marine Corps, Air Force, and Defense Logistics Agency (DLA) operations. MSC's Technology roadmap is documented in MSC's *Corporate Plan*.

Military Surface Deployment and Distribution Command (SDDC)

SDDC provides ocean terminal, commercial ocean liner service and traffic management functions to deploy, sustain and redeploy U.S. forces on a global basis. SDDC interfaces between DOD shippers and the commercial transportation carrier for surface movements including household goods and privately owned vehicles. The Command provides globally deployable engineering and analysis support, serves as the single port manager to geographic combatant commanders (managing 24 ports worldwide including military terminals at Sunny Point NC and Concord CA), and develops integrated traffic management systems. Specific technology innovations designed to achieve SDDC future readiness capabilities is contained in the *SDDC Strategic Plan*. SDDC will focus on combining technologies so we can synchronize surface deployment and distribution from factory to foxhole. Examples include: providing reliable communications, integrated Information Technology (IT) systems and modeling/simulation that supports all phases of surface deployment and distribution, and knowledge management for rapid exchange and display of information and data.

Defense Transportation System (DTS)

The DTS is an integral part of the nation's transportation system and involves procedures and relationships between the DOD and the federal, commercial, and non-U.S. activities that support DOD transportation needs. The DTS is that portion of America's transportation infrastructure which supports

DOD transportation needs in peace and war and consists of those military and commercial assets, services and systems organic to, contracted for, or controlled by the DOD. Its infrastructure, including ports, airlift, air refueling, sealift, in-transit visibility (ITV), traffic management, and contracting capability, is a vital element of DOD's ability to project power worldwide. Defense transportation refers to common-user transportation defined by DOD as transportation and transportation services provided on a common basis for two or more DOD organizations and, as authorized, non-DOD agencies. A robust and responsive national DTS is a critical element of America's national security strategy. USTRANSCOM's support of the U.S. national military strategy requires modern, flexible and responsive global transportation capable of integrating military, commercial and host-nation resources. The Command's vision is a DTS that is fully integrated, efficient, effective, and customer-focused.

Distribution Process Owner (DPO)

On 16 September 2003, the Secretary of Defense designated USTRANSCOM as DOD's DPO, responsible for the overall efficiency and interoperability of distribution-related activities supporting the deployment, employment, sustainment, and redeployment of global forces conducting the range of military operations. In effect, USTRANSCOM is accountable as the single entity to engineer, direct, and supervise execution of the strategic distribution system in collaboration with Office of the Secretary of Defense (OSD), Joint Staff, COCOMs, the Services, Agencies, and commercial partners.

The DPO is responsible for synchronizing the movement of cargo from a source of supply to a designated customer, balancing distribution and deployment requirements through the pipeline and expeditiously responding to warfighter requirements. The DPO's focus is on a global distribution network that provides a factory to foxhole system linking the entire DOD supply chain. The DPO's span of influence extends from the source of supply to a point forward in a theater as defined by the Regional Combatant Commander (RCC). Its goal is to improve the strategic, operational and theater processes to improve warfighter support.

As the DPO, USTRANSCOM, in concert with its TCCs and distribution partners, is pursuing an aggressive agenda to improve the effectiveness of the DOD supply chain. By developing streamlined operational processes and business rules enabled by advanced visibility and decision support tools, USTRANSCOM is endeavoring to provide the capability to collaboratively plan and synchronize the movement of forces and sustainment from a designated location, or source of supply, to a desired point of effect with a high degree of reliability. To accomplish this collaboration and synchronization, the traditional hand-off at ports, or the theater boundary, needs to fade away and be replaced with improved distribution capabilities across the enterprise. This effort will require a fundamental shift in predicting and communicating demand requirements and physical capacity and constraints across the distribution enterprise to balance the flow of joint capabilities to and from multiple theaters of operations. This transformation will be driven by a systematic E2E analysis of business processes and documented in the Joint Deployment and Distribution Architecture (JDDA), providing a common framework for our national partners to build on as we collaboratively develop the next generation of distribution capabilities. Figure 2 depicts description.

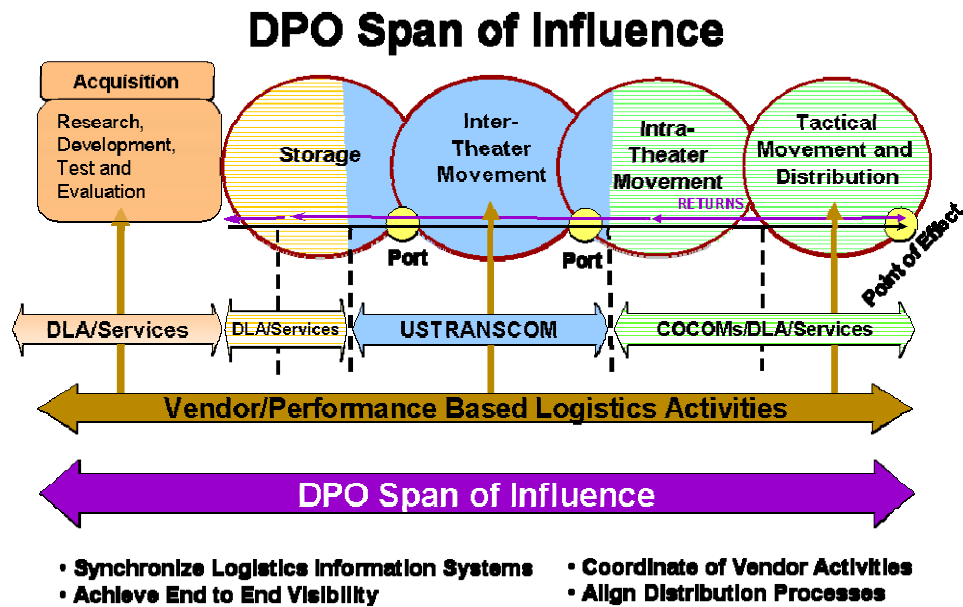


Figure 2

An improved distribution system will enable COCOMs to confidently and decisively leverage globally available capabilities (forces, equipment, and inventories) to achieve desired effects, on predictable timelines, during asymmetric operations. The E2E distribution enterprise will focus on holistic solutions, not “spot” fixes, to enable Focused Logistics capabilities and attributes desired by the DOD.

One of USTRANSCOM’s key methods to drive transformation and focus IT investment is Portfolio Management (PfM). On 28 July 2004, Deputy Under Secretary of Defense (DUSD) for Acquisition, Technology and Logistics (AT&L) and Joint Staff JSJ4 jointly designated Commander USTRANSCOM as the Distribution Portfolio Manager (for that subset of logistics systems providing key capabilities in support of distribution (sustainment and force movement) related activities). DPfM will allow the DPO to make decisions on whether to develop, modify or terminate IT systems based on architectures, risk tolerance levels, potential returns, outcome goals and performance. By eliminating outdated business practices and fulfilling DOD net-centric goals, DPfM will ensure the DPO has the appropriate IT capabilities available to perform the distribution mission and to conduct effective information operations. Figure 3 describes the DPfM management process and the inter-relationships between Enterprise Architecture (EA), PfM and IT investments.

As USTRANSCOM pursues E2E distribution process improvement in collaboration with its Joint Deployment and Distribution Enterprise (JDDE) partners, the Command will contribute to and enable a range of joint logistics mission capabilities as defined within the family of joint concept documents. The Capstone Concept for Joint Operations describes how the Joint Force intends to operate in 15 to 20 years. It provides the operational context for the transformation of the Armed Forces of the United States by linking strategic guidance with the integrated application of Joint Force capabilities. The Focused Logistics Joint Functional Concept (FL JFC) highlights several enduring joint force functions and broad challenge areas facing future joint operations including Joint Deployment/Rapid Distribution, Agile Sustainment and Information Fusion. The Joint Logistics (Distribution) Joint Integrating Concept (JIC) and C2 JFC provide the conceptual under-pinnings for the JDDE; describes its scope, central ideas, desired capabilities, and terms of reference; and outlines how the DOD will meet these challenges and provide an integrated, E2E joint deployment and distribution enterprise to enable future Joint Force Commander successful deployment, employment, sustainment, and redeployment of joint forces. In

conjunction with its logistics stakeholders, USTRANSCOM will leverage the S&T community and seek transformational technical solutions to complement policy, procedure and organizational changes to provide the warfighter synchronized movement of personnel and equipment, while providing visibility of pipeline assets throughout the E2E process.

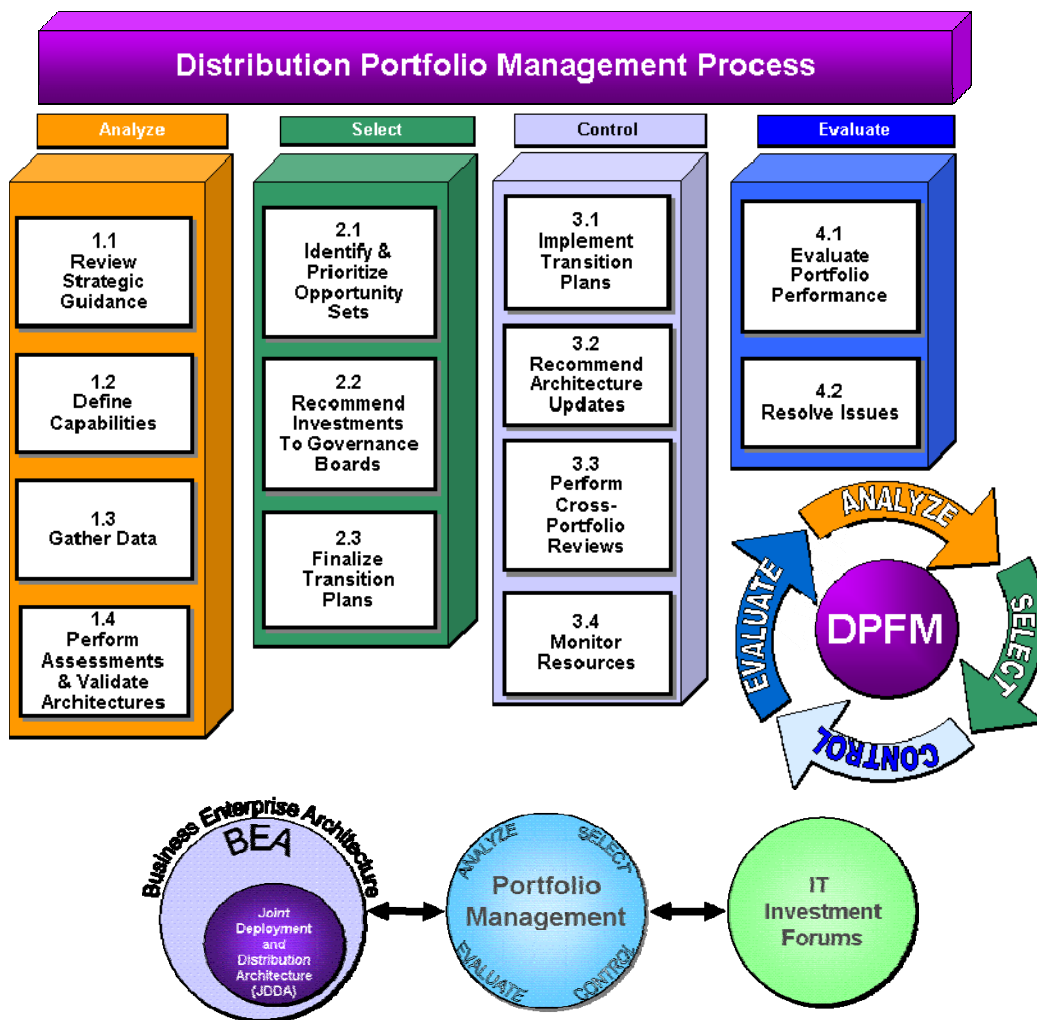


Figure 3

Joint Intermodalism

USTRANSCOM has also been designated as DOD's single manager for intermodal containers, with authority to establish joint modular container standards, approve intermodal container systems development, and manage equipment. In this role, USTRANSCOM is charged with approving any new container (general or specialized) or container configuration. DLA has been designated as the single container procurement manager for DOD with the authority to procure commercial and military specification containers and to develop contracting mechanisms for the Services and agencies to utilize. These designations will improve E2E distribution effectiveness and reduce significant risk of product redundancy, capability gaps and lack of joint interoperability by ensuring compatibility with commercial transportation systems, upon which DOD relies for the movement of cargo.

Joint Deployment and Distribution Enterprise (JDDE)

The JDDE, Figure 4, is that complex of equipment, procedures, doctrine, leaders, technical connectivity, information, shared knowledge, organizations, facilities, training, and materiel necessary to conduct joint distribution operations. The JDDE provides logistics solutions to the Joint Force Commander to minimize seams in the pipeline that characterize current strategic and theater distribution segments. Requirements and movement control are essential activities of the JDDE planning process. Warfighters need force capabilities that are obtained through the processes of requirement identification and request, sourcing the requirement, and validation of forces and sustainment requirements. The warfighter needs the ability to manage changing requirements and priorities through an integrated deployment and distribution process. Controlling the JDDE involves six major functions:

- Collecting information about the status of the JDDE and assessing its capabilities, optimizing the JDDE organization and activities
- Conducting integrated planning across modes of conveyances, terminals, organizations and lines of communication
- Communicating and controlling JDDE activities
- Collecting JDDE performance data in order to conduct an assessment of JDDE effectiveness
- Optimizing JDDE structure and actions
- Requisite visibility to execute JDDE modal operations

These major functions insure that all elements of the enterprise (organizations, terminals, lift and air refueling assets, and Lines of Communication (LOC)) are arranged in time, space, and purpose, to deliver the supported Joint Force Commander's (JFC) deployment and distribution requirements on time and at the right place, allowing the JFC to create the desired operational effect.

The following figure depicts how the JDDE will satisfy force projection and sustainment requirements by increasing E2E participation into the theater of operations subject to the JFC's direction.

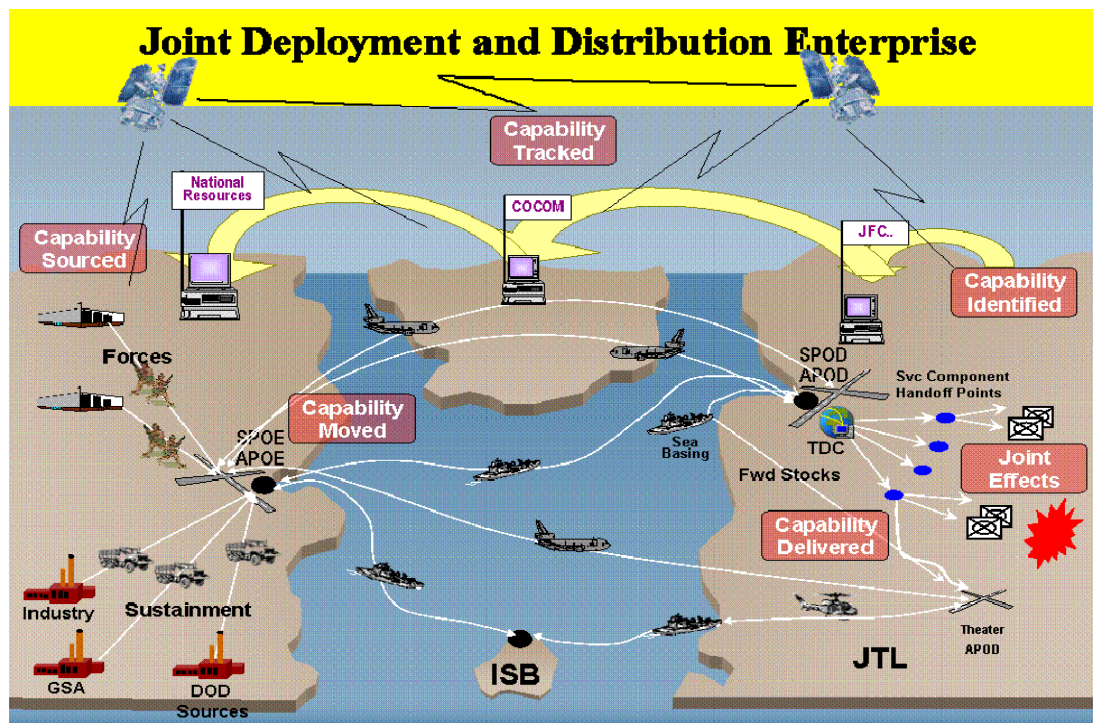


Figure 4

Deployment/Distribution Enterprise

The Joint Force Projection and Sustainment process begins with a joint force mission and the validation of requirements by the JFC to support campaign objectives and specified missions. In a very simplified sequence of actions, the JDDE partners collaborate to:

- Communicate campaign objectives and intent
- Identify and validate desired capability requirements
- Shape viable course of action options for execution
- Source available force and sustainment capabilities from global points of origin
- Synchronize movement and track capabilities to desired handoff points or points of effect
- Synchronize movement and track returning forces and retrograde stocks
- Accomplish mission tasks and achieve the commander's intent
- Evaluate performance and implement continuous process improvement

In the past, deployment operations addressed the movement of passengers and cargo fort to port; however, distribution operations include moving passengers and cargo factory to foxhole. Accordingly, all DPO/DTS operations processes and Automated Information System (AIS) must be designed on this basic premise. Distribution optimization culminates at the JJFC's desired point(s) of effect. To achieve this goal, USTRANSCOM with its components, through an integrated C2 environment, must leverage technology to acquire agile distribution processes and systems that provide the required flexibility to operate in anti-access and austere environments. In order for USTRANSCOM to provide a single entry point for all movement requirements, the command requires the IT tools and systems that provide situational awareness to decision-makers through the tracking of movement requirements, measure the effectiveness of the movement, enforce process discipline, compare plan versus actual, and provide distribution process alerts that initiate exception management action. Key elements of this Single Operating Environment for the Distribution Enterprise (SOEDE) concept are depicted in Figure 5.

Single Operating Environment for the Distribution Enterprise

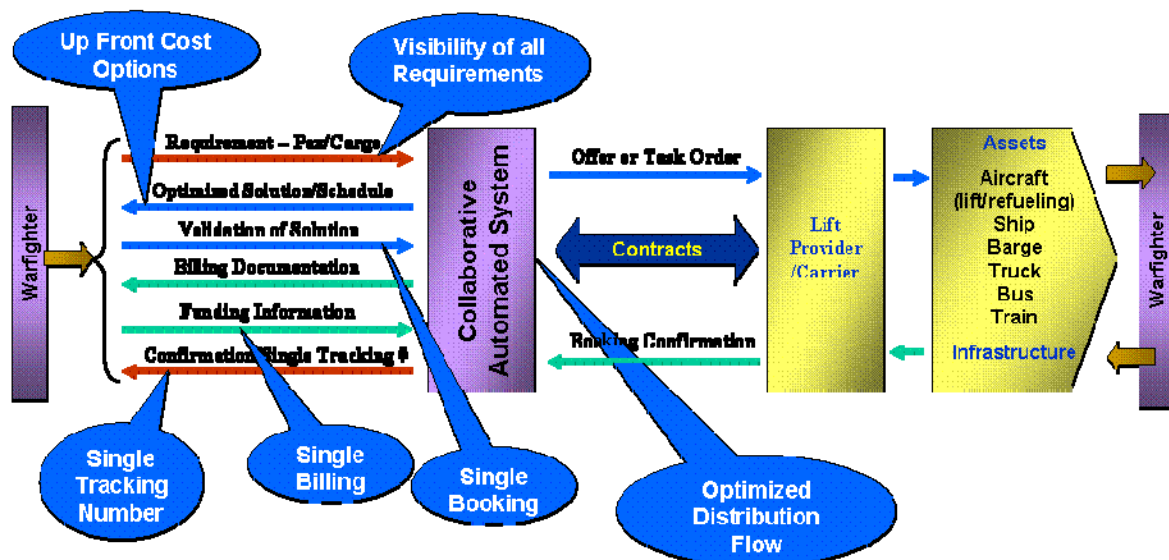


Figure 5

By providing a single face to the warfighter, projection and sustainment operations will simplify, USTRANSCOM supporting operations will improve, and customer confidence in DPO/DTS capabilities

and services will increase. USTRANSCOM requires visibility of all movements in order to exercise command and control of assets and operations in fulfillment of those requirements. A central focal point for movement requirements will:

- Improve customer support
- Make it easier to obtain DTS/DPO services
- Enhance USTRANSCOM's ability to proactively manage required support
- Enable the production and execution of optimized movement schedules
- Reduce distribution flow problems at distribution choke points
- Reduce duplicate orders
- Enhance visibility and tracking of movements
- Will enable up-front cost estimates and streamline financial management processes
- Leverage net-centric technologies through a Service Oriented Architecture (SOA)
- Maximize enterprise data exchange via net-centric interoperable standards

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Chapter II

Science and Technology (S&T) Program

Objective

The Command's S&T program is designed to place in the warfighter's hands the best mixture of capabilities possible by leveraging the best available resources to:

- Transition proven technologies to support warfighting needs
- Reduce distribution and transportation costs
- Promote mutual pursuits of technologies within S&T community
- Ensure quality

Management

The majority of DOD's science and technology program is planned, programmed and conducted by the military departments and selected Defense agencies. The departments are responsible for training and equipping the military forces, and they use the S&T program to provide warfighting and system options for their components. The Defense agencies are responsible for specified generic and cross-service aspects of S&T. They also execute designated programs in support of national security objectives. The Defense Advanced Research Projects Agency (DARPA), on the other hand, is charged with seeking breakthrough technology and with investing in technologies that are dual use, serving as basis for both defense and commercial applications.

USTRANSCOM Instruction 61-1, *Science and Technology (S&T) Program*, details the policies and procedures that govern the development, implementation and management of the Command's S&T program. It outlines applicable roles and responsibilities. It provides the framework, roles and required actions for addressing S&T efforts. Within USTRANSCOM, the Strategy, Plans, Policy, and Programs Directorate (TCJ5) is responsible for the development, orchestration and management of the Command's future science and technology needs. The Chief, Analysis, Simulation and Technology Branch (TCJ5-AS) is the designated focal point for the S&T program and is responsible for the development, management and execution of the approved plan. In the performance of this responsibility, TCJ5-AS collects S&T requirements from DTS/DPO customers, joint concept documents, operations, lessons learned, and industry; links identified need to potential technology solutions; and forwards an integrated program for implementation. Transformational IT projects are coordinated with and managed by the Chief Information Officer (CIO).

USTRANSCOM's DPO designation introduced significant challenges. Since no single organization was chartered to transform E2E distribution capabilities, it was envisioned that a centrally managed R&D effort was necessary to both explore and exploit promising technologies to transform the DOD's distribution and logistics capabilities and processes in order to both project and sustain national power and provide required warfighter support. Accordingly, a USTRANSCOM managed R&D line, within the Defense Logistics Agency R&D budget, was established to champion transformational enhancements to DOD's distribution and logistic systems and processes under a single DPO program element.

Capability Overview

USTRANSCOM's S&T Program is focused on exploring emerging solutions and tools to address identified transportation, distribution and sustainment gaps. It seeks to develop intermodal distribution velocity improvements, E2E distribution visibility, rapid deployment, and agile port technologies as well

as collaborative planning, execution and decision support tools. The following is a description of near, mid-term and long-range technology capability pursuits. Figure 6 contains a depiction of the more key solutions to enhance capabilities.

Near-term (FY06-09) Technology Pursuits

- Mode Determination/Optimization. Seeks to expand on prior Advanced Concept Technology Demonstrations (ACTD) to deliver a capability that incorporates operational and tactical level planning, adds sustainment planning, collapses planning cycle activities, determines sustainment mode, matches global requirements against available lift assets, and standardizes strategic, operational, tactical, and sustainment long-range planning and forecasting.
- Protection and Survivability of Distribution Vehicles: Transition advanced technologies for detecting and defeating anti-access threats to airlift and vertical lift platforms providing direct delivery to warfighters.
- Deployment/Distribution Knowledge. Support the integration of distribution information within the warfighter's common operating picture as well as define/implement a distribution flow predictive tool using existing data sources to include flow analysis, workload visibility across boundaries, proactive flow management and optimize distribution operations as well as resource utilization.
- Enhanced Airlift Access. Develop an all-weather airfield independent capability to enable mobility aircraft to determine landing site security/suitability without the use of on-site surveys/analysis to support more direct delivery of sustainment to the warfighter in austere environments.
- Autonomous Landing. Combine synthetic vision technology with positioning data into a heads-up display to permit opportune access to unprepared fields without land-based navigational aids.
- Coalition/Commercial Information Exchange. Develops advanced/automated capabilities to exchange logistics information with coalition and commercial partners addressing cross-domain security, information assurance and information access issues.
- Joint Intermodal Container. Study alternative designs and design an inter-service compatible container system that specifically addresses reduced repackaging and battlefield distribution issues for increased supply chain cargo throughput.
- At Sea Container Discharge. Demonstrate the ability to selectively retrieve and stow 20 foot containers from cargo holds of organic strategic sealift assets to enable sea basing distribution operations.
- 463L Associate Airlift Platform. Develops common sub-pallet system to reduce handling requirements in air and air-to-surface cargo flow, without reducing capacity, and to eliminate or reduce DOD costs due to lost/un-recovered pallets
- Joint Precision Airdrop. Develop lightweight capability for precision airdrop of supplies to a dispersed force on the battlefield while providing required protective stand-off distances for delivery aircraft.
- Cargo Threat Detection. Develops cargo detection technology to enable a low-cost, reliable broad-use hand-held explosives detector that ensures cargo integrity without impeding deployment, throughput and distribution processes.
- Cargo Total Asset Visibility. Develops systems and explores the utility of various technologies, such as new radio frequency identification (RFID) tags, with integrated global positioning system (GPS)-based or other position locators and transmitters to enable rapid and precise asset tracking/position-finding/materiel handling in austere forward areas, in tactical assembly areas, or warehouses.

Mid-term (FY10-13) Technology Pursuits

- Joint Theater Sealift Access. Demonstrates countermeasures against anti-access strategies at seaports of debarkation; investigates composite bridging to enhance Theater Support Vessel/High Speed Vessel (TSV/HSV) force flow and sustainment in austere locations, and demonstrates protection requirements to ensure E2E deployment and sustainment support to the warfighter.
- Virtual Systems Integration Facility for DPO Transformation. Provides simulation environment for design/sensitivity analysis of the E2E distribution process; explores new command center/decision-making/human interface technologies.
- Logistics Intelligent Agents. Development on modeling, simulation and decision support tools to support collaborative planning, business judgment and execution; support self-awareness requisitioning and packaging; and provide sense and respond tools to enable real-time capability to react to demand needs.
- Distribution-Based Networks. Develop a pervasive and reliable core-competence-based distribution network, integrated with the warfighter's tactical picture to proactively manage demand, supply and distribution operations.
- Fourth Party Logistics (4PL). Investigates commercial-sector best-practice 4PL concepts of operation and DPO progress toward them; develops Strategic Distribution System concepts and business rules; recommends changes to advance the DPO to 4PL status.
- Universal Cargo Handling Equipment. Develops/adapts commercial available technologies to provide universal material/cargo handling equipment with DOD's air and ground and sea distribution modes to enhance throughput operations from factory to point of use.
- Enhanced Cargo Delivery/Security. Explore the use of unmanned aerial vehicles/technologies to provide selective sustainment/re-supply to mobile tactical forces in a complex battlefield environment. Expands on previously developed low-cost, reliable handheld cargo detector to incorporate through advanced polymers the ability to detect a wide range of chemical, biological and radiological threats. Also seeks to explore technologies to secure intermodal and specialized containers from theft, tampering, and contamination.
- Sea Basing. Investigation of technologies to enhance at sea distribution operations to increase the agility and flexibility of future warfighting concepts.

Long-term (FY14-beyond) Technology Pursuits

- Next-Generation Mobility Assets. Leverage Service-initiated efforts for next-generation mobility lift assets (i.e., Advanced Mobility Concept (AMC-X), Shallow Draft High Speed Sealift, Super Short Take-Off and Landing) to enhance these new capabilities ability to provide required warfighter support in anti-access and austere operational environments. This includes development of capability for airlift assets to operate in unmarked/un-improved airfields with minimum or no ground support or for sealift assets to be able to self on/offload in shallow draft, infrastructure austere ports or from mobile staging at sea facilities.
- Virtual Intermediate Staging Base (ISB). Develop concepts and identify critical technologies to explore use of manned/unmanned distribution platforms, coupled with advanced packaging and container designs, and evaluate alternative ISB/Tactical Assembly Area (TAA).
- Global Broadband Datalinks. Explore technologies that provide the DPO the capability to replicate or link large databases, in a synchronized fashion, across a globally distributed multi-service/commercial partner network appearing to operate as a single, network-centric infrastructure, accomplished by distributed computing with highly reliable, high bandwidth communications between enclaves of servers placed to smartly distribute workload and optimized for survivability.

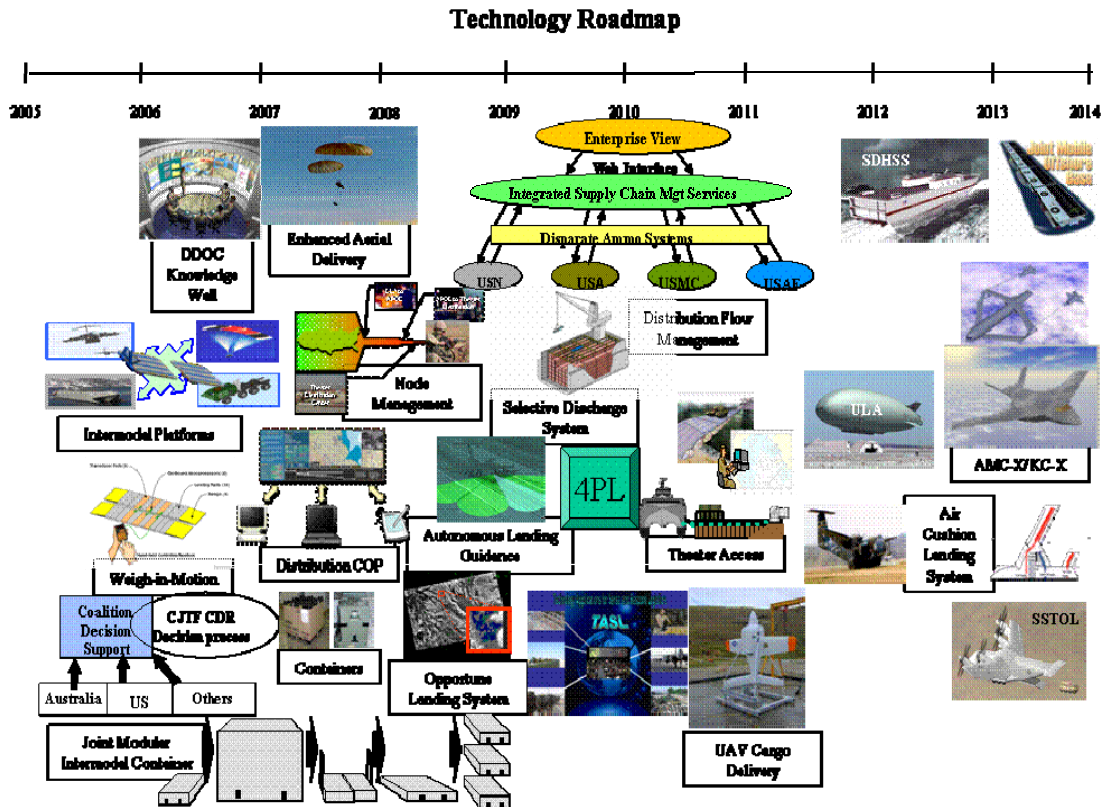


Figure 6

USTRANSCOM uses these focus areas to stabilize technology program interests, soundly manage command pursuits and provide insight to the S&T community regarding distribution and technology interest areas. Warfighter support also mandates the need to develop and implement a collaborative, integrated enterprise architecture suite. Due to its complexity, a detailed description of that need follows.

Corporate Enterprise Architecture

The Command's mission requires an integrated C2 capability that transforms information into superior knowledge enabling integrated decisions to direct and synchronize deployment and distribution (people, forces, materiel) in a single distribution enterprise environment. The DPO mission drives the need to create, with national providers, a deployable distribution synchronization capability, nest it into an existing theater logistics structure to direct distribution, and synchronize strategic and operational lift. The warfighter's view and USTRANSCOM's operational response that is entailed in executing this vision are represented in Figure 5. The customer's requirements for the distribution process owner revolve around these straight forward questions:

- Can you support my priorities?
- Where's my Stuff?
- Will it arrive when I need it?
- Can you support my changes to my earlier priorities?

To answer these questions, USTRANSCOM requires a corporate enterprise approach to operations that capitalizes on an integrated IT environment. A major operational objective is to present a single face to the warfighter (customer), which requires integration of processes and enablers to achieve unity of command and unity of effort through an uncomplicated chain of command. USTRANSCOM—with its trucks, trains, aircraft, ships, information systems, and infrastructure—should function as a single integrated team composed of Active Duty, National Guard, and Reserve Forces, combined with DOD

civilians and commercial industry partners. This concept provides the framework for achieving DPO unity of command and unity of effort.

This E2E distribution environment requires net-centricity and seamless capture and situational awareness of all constrained cargo and passenger distribution/movement requirements for deployment, sustainment, and redeployment and situational awareness of all unconstrained distribution/movement requirements. Salient SOEDE requirements include: establishing a single entry point for constrained movement requirements, up-front costing of movement options for the customer service decisions; distribution flow optimization, single booking and single manifesting of requirements based on optimized transportation execution schedules; advance shipping notice to distribution nodes; and a single tracking number that ensures requirement traceability assigned at inception of the requirement. This environment will enable the DPO to perform proactive vice reactive direction and management of distribution processes to support warfighter (customer) priorities in all levels of contingencies throughout the current and anticipated battle space environment.

This concept capitalizes on improved technology and standards available to resolve the longstanding Command and Control (C2) and data management issues and to deliver the integrated E2E distribution and transportation capability our customers require (Figure 7). A single entry point for movement (distribution) requirements, shipping notification, and situational awareness will provide an encompassing solution drawing upon multiple resources to provide a “glass distribution pipeline,” whose transparency provides stakeholders with complete distribution process situational awareness (visibility). On both strategic and operational levels, optimization and scheduling solutions will apply business rules, optimization algorithms, and management practices to optimize delivery of distribution pipeline requirements to the warfighter, and build optimized movement plans that the Deployment Distribution Operations Center (DDOC) tasks the TCCs for coordinated execution. On the tactical level, the TCCs and theater logisticians manage scarce lift assets moving forces, cargo, and passengers through the distribution nodes to their destinations. This process cannot be accomplished in an isolated or closed environment. The entire execution arena is directed by exercise of centralized C2 processes and systems and observed and tracked through Total Asset Visibility (TAV) processes and systems.

Integrated E2E Distribution/Transportation Capability

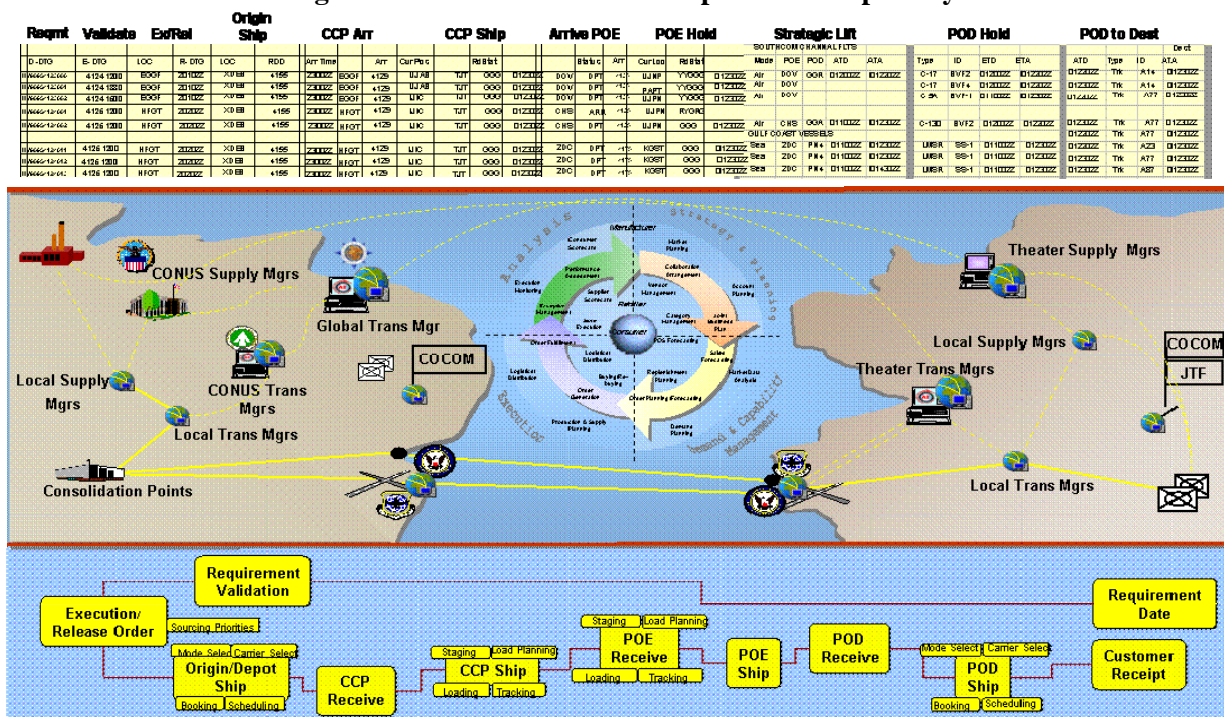


Figure 7

In the near future, USTRANSCOM will be moving toward a dynamic executable environment collapsing various Joint Operational Planning and Execution System (JOPES) processes. With the innovation of new commercially driven information technologies, USTRANSCOM and other combatant commanders will be able to shift from a linear, sequential process to a multi-dimensional E2E process.

USTRANSCOM and its customers, in deep collaboration, will be able to dynamically identify, build and allocate forces while simultaneously making mode determination and producing flexible executable schedules. Distribution optimization will be USTRANSCOM's centerpiece in this new environment as we bring balance to DPO resources.

USTRANSCOM will not be dependent on any one system to flow requirements. The architecture must be flexible enough to accommodate any force building and sustainment requirements generation system input, as long as the customer provides the three basic criteria for a requirement:

- What is the item being delivered (content level detail/accurate data)
- Where is the desired delivery location (destination)
- When is the required delivery date (RDD)

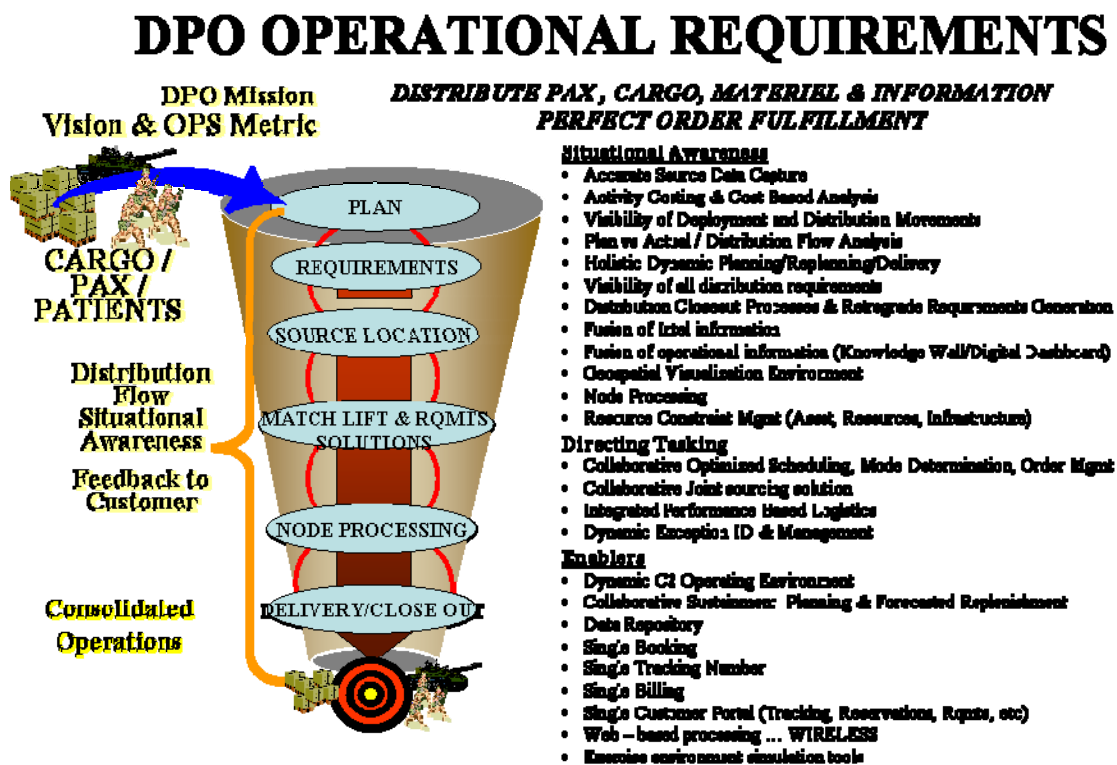


Figure 8

The DPO mission can be described in terms of distributing passengers, cargo, forces, materiel and information across a continuum of processes spanning planning, requirements capture and validation, capabilities to match lift solutions to the requirements, capturing node processing information and performing effective command and control functions in response to flow issues, and achieving close out reporting (Figure 8). Focused capability responses are required to support situational awareness, ability to effectively task and direct execution, and enablers for the distribution processes. Specific required capabilities that must be accommodated within this comprehensive Single Operating Environment architecture include the following:

Situational Awareness

- Accurate source data capture
- Activity costing and cost based analysis
- Visibility of deployment and distribution movements
- Plan versus actual distribution flow analysis
- Holistic dynamic planning, re-planning and delivery
- Visibility of all distribution requirements
- Distribution closeout processes and retrograde requirements generation
- Fusion of intelligence information
- Fusion of operational information
- Geospatial visualization environment
- Node processing
- Resource constraint management

Directing Tasking

- Collaborative optimized scheduling, mode determination and order management
- Collaborative joint sourcing solution
- Integrated performance based logistics
- Dynamic exception identification and management

Enablers

- Dynamic C2 operating environment
- Collaborative sustainment planning and forecasted replenishment
- Data repository
- Single booking
- Single tracking number
- Single billing
- Single customer portal (e.g., tracking, reservations, requirements)

- Web-based processing
- Exercise environment simulation tools

The DPO is faced with the task of assimilating a large number of distribution process IT support systems. USTRANSCOM uses a centralized planning and decentralized execution concept of operations. The DTS, however, is currently fragmented due to separate peace and wartime processes and systems, Service specific processes and systems, and various legacy stove-piped processes and systems along traditional lines of authority. We expect to find that the preponderance of existing DPO-related systems will share a similar stove-piped relationship. To fulfill DPO responsibilities, USTRANSCOM will most probably have to implement an enterprise-wide migration strategy that establishes an information/capability-centric, corporate operational environment.

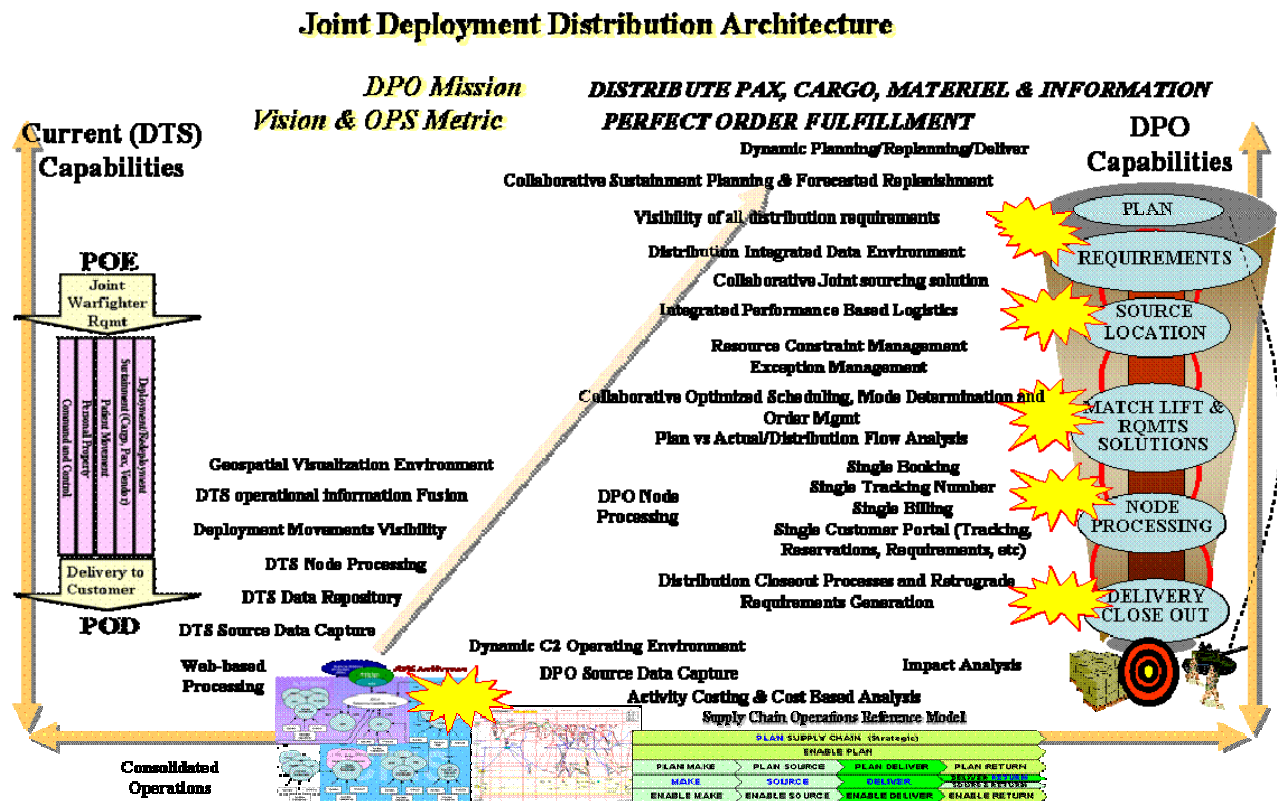


Figure 9

Figure 9 represents the operational priorities and architectural challenges we face as we position ourselves to support the distribution process owner responsibilities. The enterprise architecture needs to reflect and support these operational priorities. In addition, there is need for improved access to and interface with the information required to support associated decision-making processes. Development and presentation of accurate and timely decision-ready information across USTRANSCOM, our customers and our national partners are an operational imperative for distribution process management. Some examples of the desired system performance parameters, capabilities, of required operational interfaces are (Table 1):

| System Performance Parameter | Goal | Stretch Goal |
|--|---|--|
| 1. Data Element Requirement Analyzer Provide capability to display information on the data elements needed by a customer (i.e. Unit Mobility Officer (UMO) or transportation officer) to move the customer's passengers, cargo, or equipment between any point A and any point B of the transportation and/or distribution process, track the customer's shipment through the process, and receive a bill for the movement. Also, provide IT system details (name and data elements) that support the particular movement requested above. | Produce query results as a tabular display of data elements with supporting IT systems details (name, capability, and product.) | Graphical display of data elements and IT details (like a process flow chart). |
| 2. Gaps and Redundancy Analyzer Provide ability to determine gaps and redundancies in IT support to the transportation and/or distribution processes, leveraging the enterprise architecture and portfolio management processes. | Produce query list of activities, information exchange requirements (IER), and products, and the supporting IT system details, for each of the core process maps. | Produce query list of all activities and products that are duplicated by multiple supporting IT systems or not supported by any IT system. |
| 3. Data Element Tracer Provide ability to trace and troubleshoot data element problems caused by data transformations. Some data elements get modified as they move through the transportation/distribution process and require an ability to trace their path through the process to affect a technical solution. | Produce list of all activities, products, and supporting IT systems for a single, queried data element | Graphically display the path of a data element through each core process map for a single, queried data element. |
| 4. Collaboration Tool Provide method to identify shared activities and IER between the Joint Deployment Process Owner (JDPO) and the Distribution Process Owner (DPO) architectures. | Produce list of shared tasks, associated business rules and supporting IT systems | Graphically display process maps with JDPO/DPO overlaps. |
| 5. Demonstration Tool Demonstrate how a single shipment entity moves through each process map. This tool will be useful for conducting process improvement workshops, briefings on specific issues, or teaching customers how key processes work. | Simplified graphic display of key data elements, products, activities, and supporting IT systems needed to move, track, and bill core business segments as required. (For example, UMO role (what data is required) in the deployment process.) | Ideal tool will allow construction of ad hoc demonstrations. |
| 6. Metrics Management Tool Demonstrate effective suite of tools to capture, display and assist in analyzing measures of performance across the USTRANSCOM DPO enterprise | Simplified graphic display of key information, trends, process output and outcome measures needed to assess DPO effectiveness and efficiency | Ideal tool will be extensible across the spectrum of the DPO stakeholders and will feed effective process improvement efforts. |
| 7. Strategic Planning Tool Demonstrate a suite of tools to support strategic planning | Simplified graphic display of progress toward achieving strategic goals and objectives outcomes | Ideal tool will significantly support long term commitment to strategies that bridge multiple leadership changeouts |

Table 1

Enterprise Architecture (EA)

Enterprise Architecture (EA) provides a strategic planning framework that integrates and aligns IT with the business functions that it supports. The EA is the functional and technical baseline providing a blueprint that is used for DOD business transformation that helps ensure the right capabilities, resources and materiel are rapidly delivered to our warfighters: what they need, where they need it, when they need it, and in the condition they need it.

The EA sets joint mission capabilities, business rules, information exchanges, and system data/interfaces that are being integrated with the architectures of DOD's components and agencies. Current efforts include the JDDA project to align Services, DLA, USTRANSCOM, and JFCOM architectures using the Supply Chain Operational Reference (SCOR) model. DPFM processes will use the EA in the Capabilities Based Assessment Team (CBAT) Functional Solution Analyses (FSA) development for DOTMLPF Change Request (DCR) and Initial Capabilities Development (ICD) documents for approval by the Joint Requirements Oversight Council (JROC). The ultimate benefit will be the transformation of business operations to improve warfighter support and maintain financial accountability. Figure 10 depicts enterprise transformation and areas of change.

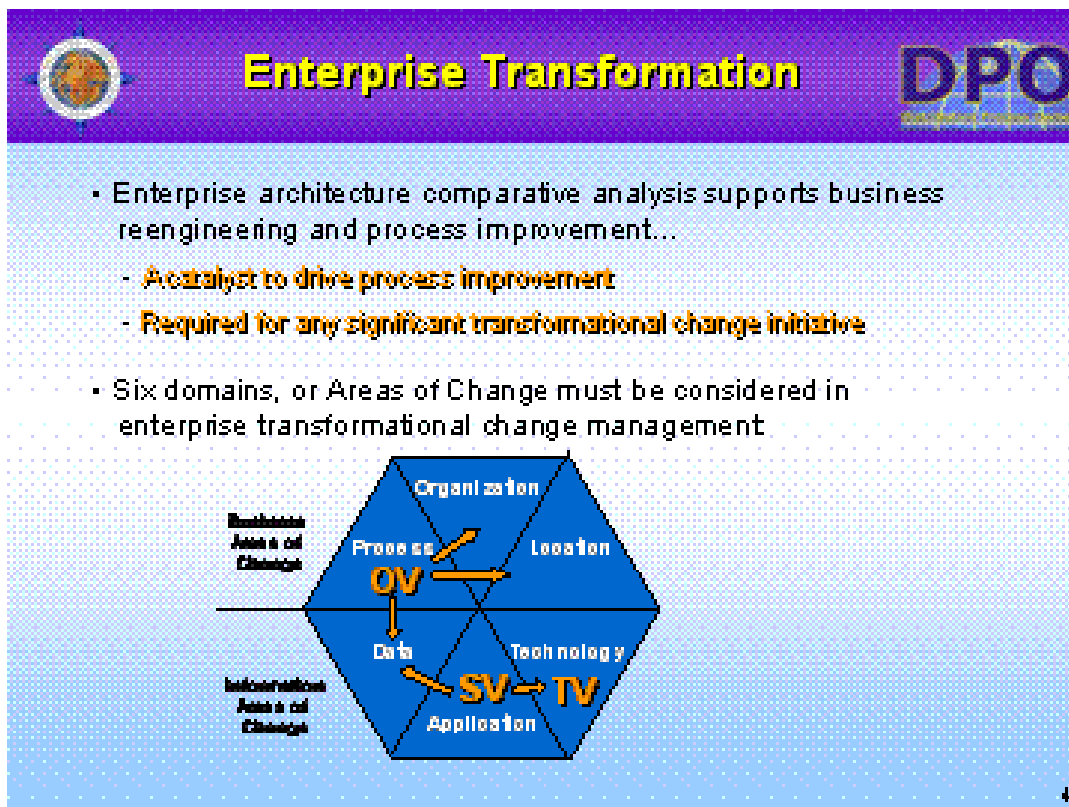


Figure10

Chapter III

Role of Science and Technology (S&T)

Objectives

S&T investment has historically been and will continue to be a key warfighter transformation enabler. The creation of joint distribution and transportation capabilities depends on an investment strategy driven by requirements. Supporting the current and future USTRANSCOM vision, the command's S&T investments will ensure the following results:

- Timely demonstrations of affordable technologies/concepts that enable
 - Force projection as desired/required by the warfighter
 - Distribution processes/capabilities that make logistics an operational enabler
 - Capabilities definition/prioritization through demonstration/experimentation
- S&T that reduces cost through
 - Reduced distribution and transportation barriers
 - Enhanced projection, throughput and distribution reform
- World-class global transportation/distribution network that
 - Maintains projection and sustainment superiority
 - Leverages Service/Agency and commercial technologies
 - Enables the command's vision

Investment Objectives

Supporting the S&T vision, USTRANSCOM's investment objectives include:

- Develop state of the art intermodal processes, equipment and automation that provides a quantum improvement leap in DOD's transportation system
- Develop improvements in force and unit-level command and control processes, which integrate and are interoperable with other joint, coalition and civil C2 processes
- Leverage joint C2 functional concepts to provide common architectures to support joint customers
- Innovation in supply chain and distribution management and process execution
- Develop improvements which integrate and improve the deployment and distribution processes
- Investigate and develop super-effective and efficient logistics business processes
- Couple S&T objectives and products to production and procurement programs
- Provide stable support for S&T priorities and funding

- Improve R&D program execution and oversight

How USTRANSCOM Interacts with the S&T Process

The fundamental role of DOD's S&T program is to enable a technologically superior military force. This program addresses user needs, maintains a broad-based program spanning all Defense-relevant sciences and technologies to anticipate future needs and those not being pursued by the civil or commercial communities, preserves long-range research, and enables rapid transition from the S&T base to useful military products. S&T projects focus on increasing the effectiveness of a capability while decreasing cost, increasing operational life, and incrementally improving products through planned upgrades. See Figure 11 for a depiction of these various agencies.

Science and Technology (S&T) Community

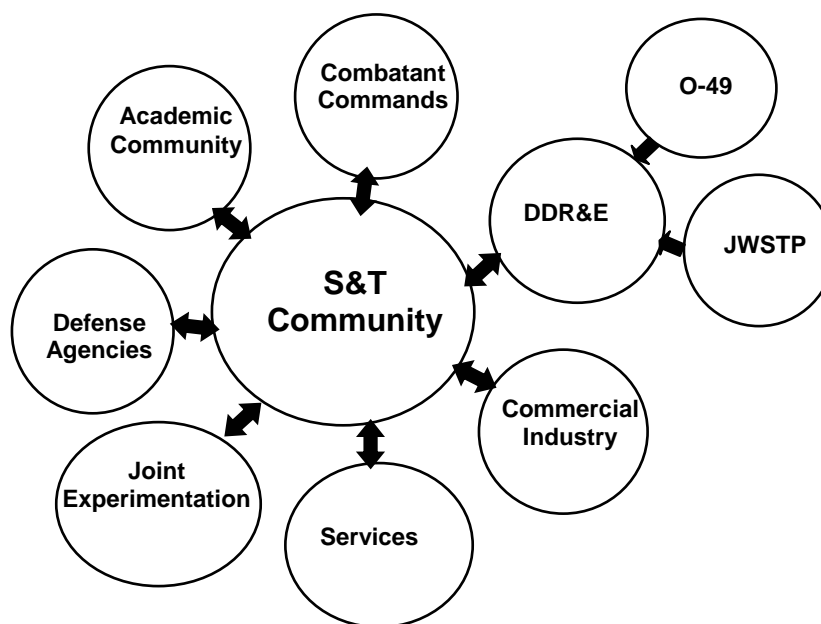


Figure 11

USTRANSCOM's close interaction with above organizations enables the command to pursue a variety of technology initiatives to enhance the operational capabilities of the Defense transportation and distribution systems. The command's S&T program leverages the capabilities-based process which analyzes capabilities and identifies deficiencies to inform S&T investment decisions needed to achieve this vision and its supporting objectives. It provides a plan for leveraging government and industry academic resources.

Within the DOD, the principle vehicle for reviewing and managing joint S&T requirements has been a series of roadmap documents written by the Office of the Director, Defense Research & Engineering (DDR&E) under the Under Secretary of Defense for Acquisition, Technology & Logistics. These documents are the Basic Research Plan (BRP), the Defense Technology Area Plan (DTAP) and the Joint Warfighting Science & Technology Plan (JWSTP).

The BRP is generated bi-annually using six strategic research objectives to review the range of basic research programs, which largely consist of the activities of universities, industry, and the service labs in various technical disciplines. The DTAP reviews applied research and technology demonstration programs. The JWSTP is the primary vehicle for providing a joint perspective to ensure that technology

development efforts are linked and address critical capability challenges associated with future joint/coalition operations. The JWSTP analyzes the same programs as the DTAP, but uses a different categorization scheme, and covers technologies associated with ACTDs and Advanced Technology Demonstrations (ATD). Both the DTAP and JWSTP are developed through DDR&E managed Reliance Panels with external review by Department R&D organizations and the various Joint Staff-led Functional Capabilities Boards (FCB).

DOD's S&T programs are managed by DDR&E who is responsible for overseeing the priorities, programs and strategies of the DOD's RDT&E program. The current joint S&T process is summarized in Figure 12. The graphics in black depict key documents and programs, while the graphics in blue depict key meetings and organizations. The review and feedback process is depicted in green.

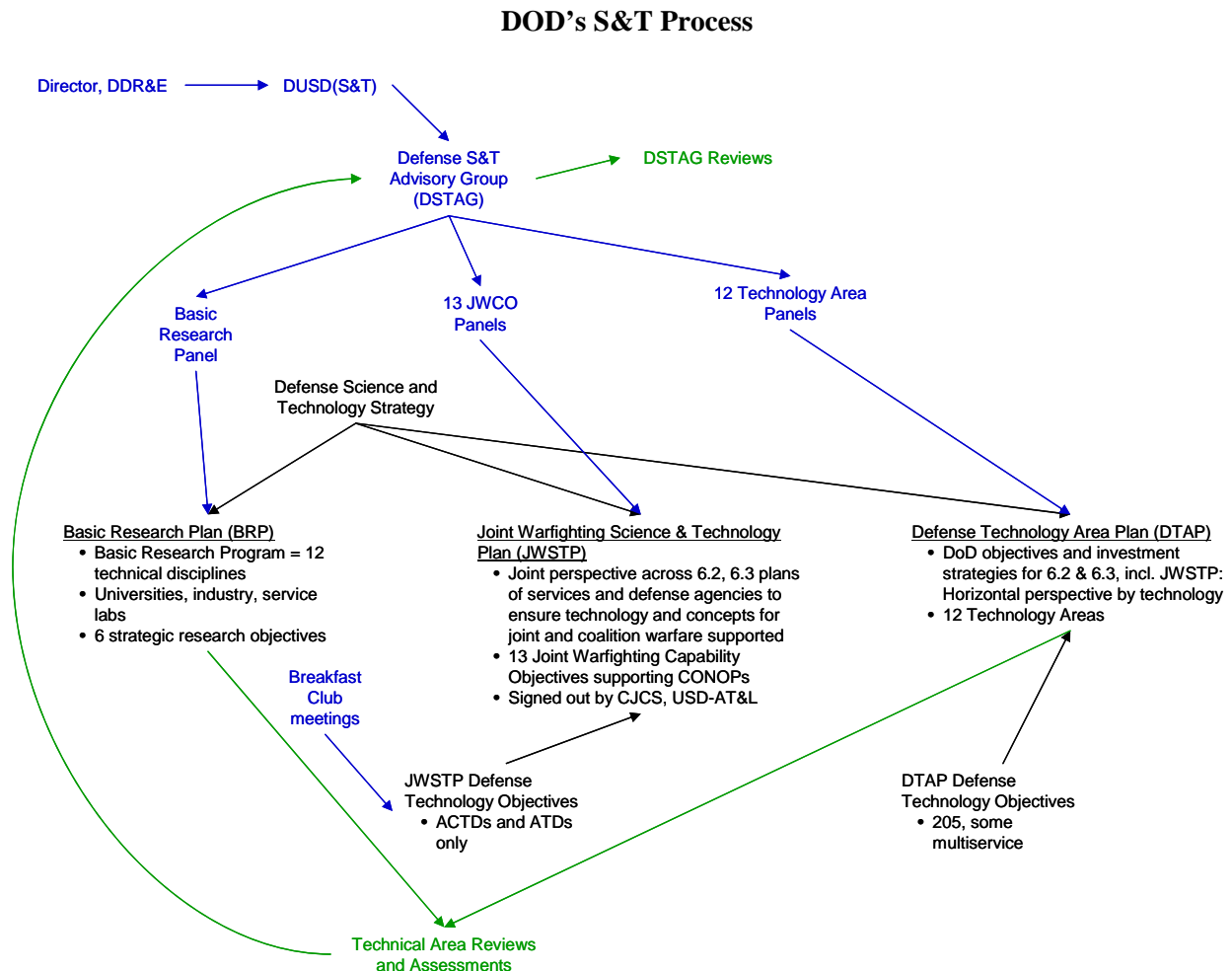


Figure 12

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Conclusion

The United States Transportation Command is the single manager for DOD common-user transportation as well as the DPO tasked to improve all aspects of distribution for the DOD from manufacture to delivery to the soldier in the field. This program leverages insights gained through the Joint Exercise Program, Joint Experimentation, Lessons Learned, and ongoing operations as well as future capabilities as defined by the Joint Concept Development documents and JCIDS in developing the corporate S&T investment strategy. USTRANSCOM's S&T program is focused on the pursuit of transformation technologies to provide the warfighter enhanced distribution, sustainment and transportation support enhancing joint operations. USTRANSCOM's RDT&E program will explore transformational technological innovation through partnerships with Service and national laboratories, applicable defense agencies, other combatant commands, industry, academia, and select non-DOD government organizations (e.g., Department of Homeland Security/Department of Energy) efforts.

The T3P is approved by the Commander, United States Transportation Command. It is the technology roadmap for achieving the Command's S&T vision. This plan is provided to government, industry and academia to convey USTRANSCOM's S&T vision, objectives and priorities as well as the investment strategy and corresponding schedules and projected technical accomplishments reflected within authorized levels of funding.

Technological superiority is essential to ensure that the DOD can continue to maintain its advantage over potential adversaries and support national taskings. Critical to meeting this requirement is the need to transform our deployment, operational, sustainment, and redeployment capabilities. A centrally managed research and development effort is critical to this 21st Century warfighter reformation. As the DPO, USTRANSCOM's S&T program will ensure, within the deployment and sustainment transportation and distribution arena, that affordable technological superiority and revolutionary capabilities are provided to the DOD.

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Appendix A -Technology Areas of Interest

To provide guidance to the Science and Technology (S&T) community, the United States Transportation Command (USTRANSCOM) has established several technology areas of interest. These identify specific technological capabilities required to enhance distribution, transportation, planning/execution, and decision support processes. The Command requires greater flexibility in adjusting the flow of integrated joint capabilities that support the changing and/or evolving plan of the Combatant Commander. This includes a truly responsive deployment, planning and execution system that accommodates capabilities-based force packaging and flexible deployment options. Initiatives being pursued, outlined in Appendix A, must be consistent with funding available in the current year budget as well as the Future Years Defense Plan (FYDP). Un-prioritized technology needs, including those under Service Title X purview, which support transportation and distribution deployment and sustainment capability enhancements follow:

Capability-Based Logistics

1. Rapid Distribution Technologies: Technologies that improve the end-to-end (E2E) flow of military unit equipment and cargo through ocean ports, aerial ports and intermodal inter-change points. Technology concepts that improve deployment speed and throughput are critical to providing required customer support.
2. Tailored Distribution Technologies: Seeking technologies that provide timely capability to deliver cargo to dangerous (i.e., anti-access/austere) locations across a complex, distributed battlefield without jeopardizing a human pilot's safety.
3. Cross-Domain Information Exchange/Collaboration: A key characteristic of our global mobility mission is the need to seamlessly interact/interoperate with actors from various military and increasingly civil domains. The need for military/civil interaction has grown in importance and immediacy with the shift in focus toward home basing and Homeland Defense posturing. In both cases, closer interoperability between non-traditional actors is the key to preparing and responding to threats in a truly global manner. It is essential to capitalize on information exchange efforts to build coherent solutions that maximize synergy. Numerous military, civil, and commercial research threads are producing revolutionary capabilities to share information across domains to include guarding capabilities that transfer information across security domains in a web environment and web evolution from a human to machine interaction (as smart agents). Viable variants include: "semantic web" technology, where the meaning of web content is conveyed in both human and machine readable format; "publish/subscribe" services, where machines can communicate context sensitive content without all the constraints of traditional interfaces; various flavors of web services, which mediate data to make it more available/sharable; and numerous collaborative toolsets, which allow problems to be solved in real-time, across domains, without delaying the process with serial communications needs.
4. Knowledge Management and Business Intelligence Systems: Integrated enterprise systems that include web-based portals of entry, enterprise data repositories, integrated data environments, advanced data and text search engines, integrated Enterprise Resource Planning (ERP) applications, and advanced data discovery software for the analysis and display of context-rich information is critical for knowledge management and business intelligence. Interest includes knowledge fusion of heterogeneous data and multimedia types, data mining, text mining, knowledge agents, knowledge brokers, knowledge visualization systems, federated knowledge warehouses, and knowledge standards.

Deployment/Distribution Velocity Management

1. Opportune Landing Site Identification: All-weather airfield independence technology focusing on mobility aircraft determining the security of a landing site for arrival and through operations without use of a pre-coordinated survey or on-site, ground party analysis. This would allow more efficient operations in forward areas. The benefit produces more agility for Air Mobility Command (AMC) assets to operate in the forward battle area as well as more effective combat utility in adverse weather and low visibility operations.
2. Autonomous Aircraft Approach and Landing Guidance: All-weather take-off and landing capability technology focusing on a true, all weather (zero/zero), landing and take-off capability for mobility aircraft from prepared and unprepared fields. This technology supports the capability to rapidly deliver equipment and supplies to the warfighter. These operations may require landing aircraft under inclement weather conditions without assistance from navigation guidance systems that is commonly available at most U.S. airports. This will allow more efficient operations in forward areas and will help alleviate atmospheric conditions as a limiting factor during combat. Recent military operations have highlighted the need for an Autonomous Landing Capability (ALC) on military aircraft. ALC will provide a true "first-in" capability (no reliance on support equipment). It will allow unrestricted operations during adverse weather at any airfield, regardless of the availability of ground based navigation aids, airfield markings, and approach/runway lighting. This technology will increase our agility to operate air mobility assets in the forward battle area as well as more effective combat utility in adverse weather and low visibility operations.
3. High Altitude Precision Airdrop: Humanitarian airdrop in threat areas and re-supply of special operations forces in austere conditions are just two of ballooning mission areas driving the need for more accurate airdrop from higher altitudes. This area applies to technologies to ensure survivability of aircraft while delivering cargo to a precise location within a high threat environment.
4. Automated Hazardous Materials Processing: The use of automated tools and technology will greatly enhance the processing and reduce loading time of combat units. The ability to quickly identify chemical and component incompatibilities will facilitate speedier loading of vehicles, pallets and other cargo needed for quick air transport. These tools will also allow for quicker documentation generation, thus relieving the unit movements/hazardous materials personnel of the tedious process of hand generating all forms.
5. Agile Port: The future operational environment involves moving cargo, passengers, medical patient movement, etc. quicker and more efficiently through marine and air terminals. There is very little land available to support expanded cargo stowage at berth or airport terminals. Associated programs will continue to address the issues of enhancing port and terminal commercial productivity, as well as systems for rapid loading and unloading of craft, the ability to move military cargo in view of the increasing demands for greater throughput and eliminating the restrictions of available space in major port areas.
6. Standardized Intermodal Containers and Pallets: Systems that can be used by automated aircraft loading/unloading systems to include those designed to automatically scan standardized containers and pallets as they are on-loaded/off-loaded. Initiatives to be pursued must be designed to increase cargo throughput by eliminating the requirement to handle cargo multiple times during shipping; reduce the requirement for multiple Material Handling Equipment (MHE) systems; reduce need for additional ground personnel throughout the en route system; and minimize the requirement to reposition MHE to support deployment/distribution scheme. Potential technologies for containers and loading systems include self-propelled autonomous capability to proceed to an aircraft from a cargo marshalling yard for loading on/to an aircraft cargo compartment, then on to a cargo freight facility without direct human interaction. Automated aircraft loading/unloading systems may include modifications to aircraft cargo restraint and handling systems, loading ramps, and cargo compartments. Sensors in the cargo handling

system should enable automatic center of gravity and cargo weight computation for the aircraft mission computer. Other sensors could be programmed, when queried, to provide cargo identification, place of origin, destination, weight, and location data for cargo being loaded/unloaded interfacing with appropriate command and control/logistic systems/databases.

7. *Virtual Intermediate Staging Bases (ISB)*: The Command seeks technological solutions that allow the tracking of cargo and passengers from Continental United States (CONUS) to Intermediate Staging Bases (ISBs), from ISBs to forward deployed units, and vice versa. Since forward deployed units will be lighter and highly mobile in the future, the Virtual ISB will need to be extremely flexible as well. Virtual ISB will develop concepts and identify critical technology, explore use of manned/unmanned distribution platforms coupled with advanced packaging and container designs and evaluate alternative ISB/Tactical Assembly Area (TAA) concepts utilizing “system dynamics” modeling techniques.

8. *Synchronization of Mobility Ground Operations*: An increased focus on “just-in-time” logistical support and “time-definite delivery” underscores need to more closely synchronize port interactions. This requires synchronization of planning, scheduling, and operations at all Defense Transportation System (DTS) nodes. AMC’s “Velocity Initiative” is focused on synchronizing all activities at an airbase, to cut ground time for airlift assets from 3-4 hours, to as little as 1 hour. For these changes to have maximum impact across the DTS, they must be synchronized with other logistics and operational planning and execution activities, regardless of Service/component. Synchronizing the objectives of Mobility 21, the Velocity Initiative, and technology programs like Agile Transportation for the 21st Century (AT21) (which was a 2-year ACTD that explored the use of commercial-off-the-shelf supply chain information tools within the DTS whose objectives included synchronization of air and surface modes of transportation), provides fertile technology exploitation areas that could capitalize on supply chain management precepts, distributed and collaborative scheduling, and military/civil information exchange to synchronize port operations. These enhancements should address “work-flow” and “human effectiveness” analysis to optimize operational effectiveness.

Sense and Respond/Protection

1. *Cargo Screening*: Rapid and accurate screening of cargo for explosives (i.e., automated equipment capable of detecting 1 lb of explosives on a pallet-sized container with relatively no impact on throughput) and/or contraband is an essential for both force protection and rapid global mobility. Technology interests are in those systems with stand-off detection; hand-held detection; vehicle inspection detection; robotic inspection detection; unmanned vehicles detection-both on land and in the water; and fixed detectors which allow for detection before endangering personnel and/or resources. Interests include technologies that when applied detect access attempts and can be monitored for intrusion.

2. *Automatic Identification Technology (AIT)*: AIT is the basic building block in the DOD’s efforts to provide timely asset visibility, including patient movement, in the pipeline, whether in-process, in-storage, or in-transit. Mature AIT media is currently available and includes barcodes, radio frequency identification, satellite-tracking systems, smart cards, optical memory cards, and contact memory buttons. USTRANSCOM is interested in source data automation supported by AIT that will enable operators on the ground to provide information that will update the plan versus what is actually happening e.g. on a deployment. Currently, this planned versus actual data is not effectively updated at key nodes where the revised information may or may not be manually input and even if correctly input, may not be transmitted to and processed by all of the systems that require visibility and use of the data in question. This shortfall creates an information vacuum and results directly in degradation of movement requirements fidelity as well as a loss of in-transit visibility (ITV) at the entry point into the Distribution Process Owner (DPO)/DTS. USTRANSCOM is interested in concepts that improve ITV to end user in the field.

3. *Blast Mitigation*: Technology in this area is composed of blast walls; blast screens & curtains; fragmentation retention film for windows; explosive containers; and other types of fixed and mobile barriers.
4. *Force Protection*: Terrorism and asymmetric warfare pose an ever-present threat to our nation's strategic mobility assets (personnel, equipment and mobility assets) and their embarked cargo, equipment and personnel. This broad technology area of interest supports proposals to counter these types of threats. We seek advanced and affordable technologies for on and off board aircraft systems to enhance aircrew situational awareness and defeat guided missiles and emerging directed energy threats. Also of particular interest is the application of technology to create virtual borders at the point of loading; screen cargo for smuggled goods and explosive, chemical, and biological threats; and enhance seaborne and air cargo container standards. Additionally, we are interested in shipboard systems for the detection of approaching personnel, swimmers and small vessels at night and during inclement weather. Perimeter defense of airfields, seaports and bases, especially at forward operating locations, is also an area of high interest.
5. *Virtual Risk Assessment Database*: One of the most critical components is our ability to provide our forces with threat information in a timely matter during mission planning and prior to mission execution. Current processes to gather threat information from various open and classified sources are tedious and time consuming. A virtual risk assessment database needs to be developed for joint use to provide theater commanders as well as units deploying to various locations, a real time site picture of the threats that may be encountered either en route to final destinations or at intermediate staging locations. The database ensures that all forces are receiving consistent accurate information.
6. *"See First, Act First" Security Technologies*: We must prepare for a wide range of future contingencies from transnational terrorists armed with unconventional weapons to nation-states armed with advanced weapons systems and weapons of mass destruction. In order to counter this threat, we must actively seek out our adversaries and neutralize their actions before they can damage or destroy our assets. To allow us to see first, understand first and act first, we must employ an integrated protection concept across the entire force. The exploration and application of transformational technologies along with emerging unconventional force protection concepts is paramount to countering uncertain threats to preserve global mobility. In order to transform the existing compliance based reactive security infrastructure to a deliberate effects based security model, we must employ detection, delay, and denial technologies to identify and mitigate the target before they are able to destroy assets vital to national strategic objectives. Active denial systems, remote weapons, detection and surveillance (air and ground) systems, positive entry control, passive and active explosive detection devices (vehicle, personnel, hand carried) are but a few of the many technologies that must be employed to counter our adversaries' objectives.
7. *Defensive Systems for Commercial Aircraft*: Technologies that can be mated on civilian passenger and/or cargo aircraft that maximize their use and support to military operations.
8. *Survivable Logistic Local Area Network (LAN) Systems*: LAN systems that support logistics domain software which are designed to be survivable during extreme information warfare and kinetic wartime situations.
9. *Information Systems Security Automated Event Correlation System*: An automated system which allows Information Protection (IP) analysts to accept data from multiple sensors (intrusion detection platforms, firewalls), to analyze the data for anomalous patterns, known profiles, and to correlate with other events from around the Global Information Grid.

Cross Domain Intuitive Planning and Execution

1. *Information Science and Technology*: USTRANSCOM is interested in evolving, maturing

technologies that support state-of-the-art capabilities for the warfighter in the analysis, assimilation and dissemination of real and simulated digitized battlespace information. Areas of interest include, but not limited to: intelligent software agents, course of action analysis, transportation planning/feasibility, embedded training, optimization/resource allocation solutions, collaborative technologies for distributed work environments and data visualization.

2. *Seamless, Distributed Global Mobility C2*: C2 is the heart of successful military endeavors, and for global mobility, this C2 must be seamless regardless of theater of operation and/or customer being supported. This includes technologies that allow seamless, distributed, global C2 with mobile platforms whether on land, sea or in the air. Effective C2 can only be accomplished when USTRANSCOM assets have full visibility and are responsive to the needs of the warfighter. In order to effectively prosecute these missions, our global C2 must be properly distributed to provide survivability, yet be balanced with global availability. To accomplish this, we must investigate technologies that provide the capability to replicate large databases, in a synchronized fashion, across a globally distributed network. To the functional community, this will appear to operate as a single, network centric infrastructure, but in reality, it will be accomplished by distributed computing with highly reliable, high bandwidth communications between “enclaves” of servers placed to smartly distribute workload and optimize survivability. In addition, these enclaves must be capable working “off-line,” then seamlessly rejoining the global network following combat or contingency degradation. Global C2 for mobile platforms must address methods of attaining world-wide, high-bandwidth communications, together with survivable communications paths that can retain C2 connectivity under adverse conditions, whether natural or man-made. Network-centric operations are a cornerstone of the future development of C2 to the mobility platform and should incorporate such capabilities as secure and non-secure voice and data, IP addressable terminals, robust situational awareness, and continued emphasis on the use of gateways to extend Line of Sight (LOS) C2 to Beyond LOS (BLOS).

3. *Information Assurance and Survivable Communications*: The Command is interested in receiving proposals that address the underlying science and technology for survivable and secure communications and networks, information infrastructure protection, and survivable systems engineering. The objectives of the research are to provide secure, survivable, and assured communications over both the wired and wireless networks, including highly mobile networks. Interests include, but should not be limited to, advancing the state of the art in the following areas: research on automated vulnerability assessment and intrusion detection tools and techniques, attack response tools that do not deny either service or connectivity, key distribution and security in a mobile wireless ad hoc network, tools and techniques for automating the creation and distribution of interoperable vulnerability knowledge bases and network management/visualization tools in hybrid networks. Additionally, the command maintains a significant interest in network-centric satellite communications to satisfy long-haul information transfer requirements during bare-base humanitarian and contingency operations. Interests and efforts include employment of bandwidth efficient satellite transport techniques and operation of converged Internet Protocol networks providing increased capabilities, better network performance, reduced space segment consumption/costs, and minimized equipment footprints and support requirements. Quality of service and information assurance shortfalls were introduced by satellite networks, satellite communication latency effects and communication/control data encryption requirements to operate in a High Assurance Internet Protocol Environment.

4. *Database Technology*: Explore ideas and prototype tools for advanced data management concepts, including schema integration and data warehousing in a standardized data environment; enabling transparent access to multiple heterogeneous databases; data mining and knowledge discovery in large distributed databases; automated query formulation strategies using data element thesaurus capabilities; integration of data encyclopedia tools with data and process modeling tools; and automated support for electronic records management and digital signature. Implement and experiment with simultaneously and transparently accessing and manipulating data from any different databases, to include support for imaging, multimedia, object-oriented, and traditional applications. Investigate new ideas, and design,

implement and evaluate prototype data management tools that support USTRANSCOM's information architecture and modernization efforts. Evaluate transaction-based database replication technology, especially as used between geographic theaters for real-time command and control operations over the DOD-wide area network.

5. *Distribution Process*: Development of an E2E model to analyze existing processes and develop/evaluate proposed improvements within the distribution process.

6. *Autonomic Computing*: Explore the capability for voice and data networks to automatically respond to change, act intuitively to solve problems and identify potential problems before they occur. The intent is to deliver improved, uninterrupted services and higher network reliability. This autonomic computing capability will provide critical network components the "ability" to learn how the network is connected and to initiate appropriate actions without preliminary human intervention. When experiencing network failure, this technology will provide the ability to determine how to reroute traffic or restore service in an autonomous, unattended manner.

7. *Human Computer Interface(HCI)*: Many of the USTRANSCOM ITV data integrity problems are a result of poor HCIs. Intuitive HCIs that demonstrably reduce cognitive workload and lower data entry errors for planners and port operators are needed. Investigation is needed to validate the improved HCI designs' ability to improve data integrity.

8. *Information Discovery and Integration*: Support DOD Chief Information Officer (CIO) "post before process" methodology providing a "publish/subscribe" environment for sharing logistics and transportation operational information. Provides an automated tool for identifying common data elements currently shared between systems, which can be mapped to the master model. Master model naming convention for specific data elements can then be provided to program management offices for use in universal tag naming convention. This results in single vernacular for logistics and transportation information, centrally managed distributed information, and builds on current reference table, metadata repository, and master model work.

9. *Information Visualization*: USTRANSCOM needs a graphical view of logistics and transportation land, sea and air operational information with drill down capability into specific details. This technology would enable users a visual representation of information concerning inventory, movement, logistics, and transportation information as well as easier and quicker understanding of rapidly changing information.

10. *Knowledge Management Layer for the USTRANSCOM Corporate Data Environment*: The operational and technical requirements of an effective near real-time global transportation network cannot be achieved through the application of legacy data-centric software design and development principles. Such a network calls for a degree of interoperability and a level of collaborative decision-support that are not available in any existing industry or government software environment of comparable scale. It is therefore proposed to undertake a "Technical Demonstration" project that will create an information-centric Knowledge Management Layer on top of a data-centric Corporate Data Environment (CDE) Meta Database Layer. The Knowledge Management Layer will provide intelligent decision-support facilities through collaborative software agents with automatic reasoning and analysis capabilities.

11. *Change Management "Return on Investment" Modeling*: As the global mobility environment becomes more dynamic, we are constantly faced with opportunities and mandates to modify our business processes, equipment, and infrastructure. Yet we have little capability to weigh alternative courses of action and/or measure the effectiveness of the changes we implement. As funding becomes more constrained, it magnifies the importance of selecting the proper choices for changes in processes, systems, and other organizational structures. Several commercial firms and government technology agencies are skilled at the work process analysis and business process modeling which could support a "virtual DTS," where a simulation of the processes and systems could be used to evaluate the effectiveness of current

methodology and measure the effectiveness/impact of changes. This simulation could be used as an integral part of our change management processes and a mandatory step in making critical change management decisions.

Service Title X R&D Funded Capabilities

1. *High-Speed Sealift (HSS)*: As U.S. force structure continues to become increasingly reliant on responsive strategic lift, the DTS will be forced to respond with ever more sophisticated and complex answers to fulfill the demands which are placed upon it. Emerging operational concepts suggest that HSS platforms could perform critical maneuver tasks allowing U.S. forces to increase their operational and logistical flexibility. HSS technologies could accelerate the movement of high priority “cargo” (e.g., personnel, equipment, sustainment) to crisis and conflict locations, enhancing DOD power-projection capability and provide the capability for rapid entry into a theater of operations in support of missions requiring the projection, employment, and sustainment of forces across the entire spectrum of military operations as well as support retrograde patient movement. In order to accomplish this rapid force projection DOD needs to invest in the development of commercial ship builders and designers in order to develop high-speed sealift ships (capable of incremental increase in inter-theater sealift speed – initially 40-50 knots increasing to 70+ knots), with ranges greater than 7,000 nm with the capability to carry payloads of 7,500-10,000 tons.
2. *Mobility Aircraft*: This includes concepts to address anti-access concerns, more ergonomically designed crew stations that reduce aircrew workload, and modular concepts allowing for multiple configurations/missions with same/like airframe. Additionally, our aging airlift and aerial refueling fleet present a need for technologies that increase the reliability of aircraft systems and structures to include electronic control systems and more reliable avionics packages that will increase aircraft availability and airlift capacity.
3. *Advanced Mobility Aircraft*: Next generation mobility and air refueling aircraft to provide intra-theater maneuver. This advanced capability is the cornerstone of a family of aircraft that includes Advanced Mobility Concept (AMC-X), Advanced Future Tanker (KC-X), Air Force Special Operations Command’s Persistent Surface Attack System of Systems (PSAS), Advanced SOF Mobility Platform (M-X) and Air Combat Command’s Advanced Long Range Strike (B-X) as well as next generation information, surveillance and reconnaissance platform. This family of aircraft concept or Future Common Platform has been directed for research in the current Strategic Planning Guidance. AMC-X capabilities will include investigating an all-weather, high speed, longer range, more survivable Short Take-Off and Landing (STOL) platform that will deliver outsized cargo and provide vertical maneuver for the US Army’s Future Combat System into remote, austere areas. This aircraft will be capable of landing all-weather onto soft fields, pastures and other non-traditional landing sites. The AMC-X will provide DOD unparalleled capabilities in meeting the full spectrum of future combat and humanitarian mobility operations.
4. *Combat Collision Avoidance System*: All-weather, multiple aircraft formation flying and airdrop capability using spin-off technology from Automatic Air Refueling systems being developed for unmanned combat air vehicles. This technology would provide the capability for AMC aircraft to fly all-weather formation flight and airdrop missions while providing aircrew and aircraft safety during all critical phases of flight.
5. *Biometrics*: This includes entry control metrics for retinal, fingerprint, facial, voice, scent, and gait that can be easily transported, operated and maintained in a field environment.

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APPENDIX B – Current Science & Technology Investments

DEPLOYMENT/DISTRIBUTION VELOCITY MANAGEMENT

1. Autonomous Landing Capability (ALC): Demonstrate an all-weather autonomous landing capability without dependence on external navigation aids. Combines synthetic vision technology with Global Positioning System (GPS) signal processing in a display algorithm to enable identification of and approach to unmarked, non-established airfields. GPS coordinates of a suitable landing zone will be correlated into the Heads Up Display (HUD) to project suitable landing zone boundaries as a visual cue to the pilot. Weather-piercing sensor data developed in other synthetic/enhanced vision efforts will also be incorporated with the image. Primary emphasis is on user-friendly HUD/Night Vision Goggle (NVG) compatible image presentation and practical symbology to permit opportune access to unprepared fields without land-based navigational aids. Will provide the capability to deliver to airfields in all weather conditions without indigenous lighting or instrument landing.
2. Opportune Landing System (OLS): Seeks to provide soil analysis through automated hyperspectral image processing providing DTS air forces the capability to deliver and support combat forces and humanitarian relief operations virtually anywhere, regardless of indigenous infrastructure. Project will validate the accuracy of OLS to identify candidate landing zone locations under varying conditions of the state-of-the-soil. Currently, soil type is determined by manual examination of the hyperspectral image by a geologist. The analyst determines mineral content, organic content, and grain size of the soil to infer soil type. This process needs to be automated into an algorithm to compare hyperspectral signature with a correlation database to quickly and accurately determine soil type at candidate OLS locations. This technology will significantly reduce advance team site surveys and preparation by at least 90% supporting global rapid deployment, employment and sustainment of forces.
3. Joint Precision Airdrop: This program will formally link the Precision Aerial Delivery System (PADS) program with the 200-2200 pound Precision Extended Glide Airdrop System” Extra Light” Class (PEGASYS-XL). PADS provides high altitude airdrop capability by determining an accurate airdrop release point based on meteorological models and forecasts. PEGASYS-XL systems are smart autonomously controlled precision airdrop systems. These systems allow airdropping of supplies to a dispersed force on the battlefield while assuring the delivering transport aircraft is at a high enough altitude or stand-off distance to avoid ground to air threats. The deliverable for this project is an interface between PADS and PEGASYS-XL used to transfer mission data prior to PEGASYS-XL release from the transport aircraft. This effort should enhance distribution capabilities on non linear battlefields through an enhanced delivery capability to multiple sites in a single airdrop.
4. At Sea Selective Discharge System of 20 Foot Containers: The objective of this project is to physically prove the concept that standard 20 foot equivalent containers, fully loaded, can be selectively retrieved and stowed within the cargo hold of a MSC ship at sea, in sea states up to and including sea state 5, without the assistance of an external crane. This would enable more efficient transfer of the proper materiel to support the warfighter and support sea basing distribution process owner initiatives. This technology is viewed as a critical enabler supporting sea basing operations and will provide ready and less costly access to containerized cargo.
5. 463L Associate Airlift Platform (AAP): This proposal seeks to assess near-term technological capabilities to provide a low cost means to ensure 463L pallet availability to support the command’s distribution mission, minimizing throughput concerns, while saving dollars lost in system 463L pallets and nets. This concept will explore the use of a forklift accessible sub-pallet carrying a unitized load on a 463L pallet that will allow the aerial port of debarkation to remove the nets and transload the AAP and

cargo to an awaiting truck with minimal impact on velocity. This effort should significantly reduce DOD costs associated with lost/un-recovered pallets.

6. Weigh-in-Motion (WIM): This proposal, which will conclude in FY06, seeks to refine portable weigh-in-motion systems that enables weighing and recording individual axle weights; measuring and recording spacing between axles; automatically determines vehicle total weight, individual wheel weights, individual axle weights, individual axle spacings, and center of balance and assess the interfacing of that system to ensure that its data is automatically interfaced with Defense Transportation System (DTS)/Distribution Process Owner (DPO) planning, execution and visibility systems. Projected benefits include increased safety, reduction in calculation errors, and a significant enhancement in throughput capacity due to the reduction in time, manpower and documentation required to prepare vehicles for deployment.

7. All-mode Container Delivery System: This effort is designed to assess the utility of a collapsible module to serve as a bridging strategy between nearly incompatible delivery systems to enhance cargo lift capabilities and reduce throughput delays caused by repackaging efforts. This concept should provide the means to optimize both the weight and cube capabilities of a variety of delivery platforms and systems, minimizes repackaging efforts and provide an increased capability to deliver required support whenever and wherever it is needed.

8. CONTRAIL: This project will assess the utility of specialized cargo platforms for transporting military unit equipment on conventional container ships in a preposition role. If successful, this technology could free up existing roll on/roll off platforms for surge sealift providing a less costly means for attaining the additional lift required to support the warfighter.

9. Node Management and Deployable Depot: This is a Defense Logistics Agency (DLA)-originated, USTRANSCOM and Army partnership Advanced Concept Technology Demonstration (ACTD) initiative. It is a package concept intended to provide the warfighter, along with all components of the distribution pipeline, a responsive and fully manageable flow of material into any theater. The DLA Deployable Depot concept, which complements the DDOC Forward, as well as addresses Node Management concerns to ensure smoother throughput operations through improved E2E distribution visibility enhancing both planning and execution while transforming sustainment support. This project expands on the Army's Battle Command Sustainment Support System. It will provide a complete logistics common operating picture, add flexibility to theater logistics management, enhance the execution of tactical operations, and allow for effective in-theater stockage.

10. Joint Modular Intermodal Distribution System: This project will survey, model, investigate, and establish a base line for development efforts leading to the definition of an inter-service joint intermodal container system that specifically addresses modal interchange and emerging battlefield distribution issues. This is an Army-led ACTD which the United States Transportation Command (USTRANSCOM) is supporting. It is expected that this effort will reduce deployment times, reduce resources (i.e., man hours, equipment and time) needed to move supplies, and enable sea base, land and air distribution systems to operate efficiently and effectively. It is also anticipated that this effort will reduce warfighter wait time for supplies by two-thirds and logistician work hours and equipment hours by 71% and 69% respectively.

SENSE AND RESPOND/PROTECTION

1. Deployable Cargo Screening (DCS): This ACTD seeks to demonstrate the military utility of a man-portable cargo screening system and associated operational concepts. Increased terrorist threats and new regulations require improved detection operations at aerial ports world-wide for high through-put, cargo screening technology. This man-portable system will provide non-intrusive screening of pallet cargo loads moving in the DTS and have the ability to detect as little as one (1) pound of concealed explosives.

Follow-on efforts will address the threat posed by other asymmetric threats (e.g., biological and chemical). This project addresses the force protection capability gap countering terrorist threat to personnel and equipment through the sabotage of cargo.

2. Information Assurance Data Correlation Analyst and Information Protection Tools: Currently the collection of data for correlation analysis is a manual process and would benefit from automated collection for analyst to review. This project seeks to develop a data consolidation tool to assist in defining the requirements for utilizing the tool in support of data correlation activities. The system will gather information from multiple sensors and integrate this information into a comprehensive view. The proposed system will provide a structure for the sharing, integration and analysis of information attacks.

CROSS DOMAIN AND INTUITIVE PLANNING AND EXECUTION

1. Transportation Requirements, Booking and Optimization: This is a multi-stage level effort with the initial focus addressing requirements capture/visibility to enhance the systemization of additional distribution processes leading to a collaboratively interoperable environment capable of optimizing projection and distribution flow to support operational objectives while minimizing costs. Optimization efforts achieved through this effort should, at a minimum, provide the required visibility, enhanced planning and execution improvements to allow the shift of at least five (5) percent of total cargo from airlift to less costly sealift while achieving significant improvements in on-time delivery and asset utilization rates.

2. Deployment Distribution Operations Center (DDOC) Information Transformation: The DDOC is the primary command control element within USTRANSCOM, and as such, it requires the capability to rapidly, securely and synergistically collect, fuse and display executive-level information from disparate command, component and customer systems in order to orchestrate DTS/DPO requirements. This project seeks to completely transform the current methods of gathering, managing and displaying this command and control information. The DDOC Information Transformation effort will automate the current manually intensive process so fewer individuals spend time gathering data and more personnel actually analyze relevant information to make recommendations and decisions. The effort is divided into three main areas: (1) transform data into readily-available information in a form and format which decision-makers can use for command/control, (2) upgrade the DDOC presentation systems to handle this new means of displaying information, and (3) move DDOC personnel from “data miners” to information analysts and decision makers. It builds on the success of a pilot project that used the Single Mobility System (SMS) to incorporate additional DTS/DPO data as well as fuse tangential data not directly related to a movement or location. This effort is expected to free up multiple full-time DDOC positions, transforming those personnel from data miners to true action officers conducting problem analysis and conflict resolution.

3. Distribution Flow Management Improvement: Effective, active management of the logistics material flow by logistics systems operators and combat users is essential with centralized supply-chain access. This project seeks to enhance distribution flow management by providing reliable, flexible and timely logistics support, information and service for warfighters and decision-makers. During concept development, processes, systems, data requirements and data elements will be identified to support our command and control systems. This concept will provide required information to build on the DPO processes, enabling the warfighting customers to gain confidence in a system that reduces customer wait times and provides time definite delivery in strategic and operational environments.

4. End-to-End (E2E) Distribution Modeling: Transform current capabilities to model distribution related activities to perform required analysis, demonstration and experimentation of E2E deployment, sustainment and redeployment activities. This effort will provide effective analysis and assessment of DPO activities, provide the backbone for distribution associated programatics and support the

experimentation of new deployment and sustainment concepts to match evolving Service employment strategies. This effort involves the migration/incorporation of current models into an enhanced E2E tool.

5. Net-Centric Deployed Distribution Process Air Component Interoperability: Focus of this effort is to improve command and control visibility of deployed distribution process air component missions through an improved automated information exchange between Air Mobility Command (AMC) and the Joint Force Air Component Command (JFACC) C2 systems. The expected return on investment includes the reduction of current workload and synchronization of operations within deployed distribution processing area due to machine-to-machine information exchanges between the Tanker Airlift Control Center (TACC), Director of Mobility Forces (DIRMOBFOR), and JFACC domains. This project will provide the real-time, collaborative planning and execution capability required by the warfighter and by relying on web services will lower the costs of connection, reduce the complexity of operations, provide platform independence, and offer opportunities for the retirement of legacy information technology (IT) systems.

6. Air Mobility Operations Planning Support Tool: This project seeks to develop adequate aerial tanker planning tools to conduct more efficient and effective global air mobility operations. This tool should enhance the rapid deployment, employment and sustainment of tanker aircraft operations supporting the DTS through more effective basing, sortie generation planning, manpower allocation, and airspace planning.

APPENDIX C – Acronyms and Abbreviations

| | |
|---------|--|
| 4PL | Fourth Party Logistics |
| AAP | Associate Airlift Platform |
| ACTD | Advanced Concept Technology Demonstration |
| AIS | Automated Information System |
| AIT | Automatic Identification Technology |
| ALC | Autonomous Landing Capability |
| AMC | Air Mobility Command |
| AMC-X | Advanced Mobility Concept |
| AMMP | Air Mobility Master Plan |
| ATD | Advanced Technology Demonstration |
| AT&L | Acquisition, Technology, and Logistics |
| BEA-LOG | Business Enterprise Architecture–Logistics |
| BLOS | Beyond Line of Sight |
| BRP | Basic Research Plan |
| B-X | Advanced Long Range Strike |
| C2 | Command and Control |
| CBAT | Capabilities Based Analysis Team |
| CDE | Corporate Data Enterprise |
| CIO | Chief Information Officer |
| COCOM | Combatant Command or Combatant Commander |
| CONOPS | Concept of Operations |
| CONUS | Continental United States |
| C2 | Command and Control |
| DAB | Defense Acquisition Board |

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|------------|---|
| DARPA | Defense Advanced Research Projects Agency |
| DCR | DOTMLPF Change Request |
| DCS | Deployable Cargo Screening |
| DDOC | Deployment Distribution Operations Center |
| DDR&E | Director, Defense Research & Engineering |
| DIRMOBFOR | Director Mobility Forces |
| DLA | Defense Logistics Agency |
| DOD | Department of Defense |
| DPfM | Distribution Portfolio Management |
| DPO | Distribution Process Owner |
| DSTAG | Defense Science and Technology Advisory Group |
| DTAP | Defense Technology Area Plan |
| DTO | Defense Technology Objective |
| DTS | Defense Transportation System |
| DUSD(LM&R) | Deputy Under Secretary of Logistics, Management & Resources |
| DUSD(S&T) | Deputy Under Secretary of Defense for Science & Technology |
| E2E | End-to-End |
| EA | Enterprise Architecture |
| ERP | Enterprise Resource Planning |
| FCB | Functional Capabilities Board |
| FL JFC | Focused Logistics Joint Functional Concept |
| FSA | Functional Solutions Analysis |
| FYDP | Fiscal Year Defense Plan |
| GCCS | Global Command and Control System |
| GDSS | Global Decision Support System |

| | |
|--------|---|
| GFM | Global Force Management |
| GPS | Global Positioning System |
| HCI | Human Computer Interface |
| HSS | High Speed Sealift |
| HUD | Heads Up Display |
| ICD | Initial Capabilities Document |
| ICODES | Integrated Computerized Deployment System |
| IER | Information Exchange Requirement |
| IP | Information Protocol |
| ISB | Intermediate Staging Base |
| IT | Information Technology |
| ITV | In-transit Visibility |
| JCIDS | Joint Capabilities Integration and Development System |
| JDDA | Joint Deployment and Distribution Architecture |
| JDDE | Joint Deployment and Distribution Enterprise |
| JDPO | Joint Deployment Process Owner |
| JFACC | Joint Force Air Component Command |
| JFC | Joint Force Commander |
| JIC | Joint Integrating Concept |
| JOPES | Joint Operational Planning and Execution System |
| JROC | Joint Requirements Oversight Council |
| JWCO | Joint Warfighting Capability Objective |
| JWSTP | Joint Warfighting Science & Technology Plan |
| KC-X | Advanced Future Tanker |
| LAN | Local Area Network |

| | |
|------------|--|
| LOC | Line of Communication |
| LOS | Line of Sight |
| MHE | Material Handling Equipment |
| MSC | Military Sealift Command |
| M-X | Advanced Special Operations Forces Mobility Platform |
| NVG | Night Vision Goggle |
| OLS | Opportune Landing System |
| PADS | Precision Aerial Delivery System |
| PEGASYS-XL | Precision Extended Glide Airdrop System-Extra Light |
| PfM | Portfolio Management |
| POD | Port of Debarkation |
| POE | Port of Embarkation |
| PPBE | Planning, Programming, Budgeting, and Execution |
| PSAS | Persistent Surface Attack System of Systems |
| R&D | Research and Development |
| RCC | Regional Combatant Command |
| RDD | Required Delivery Date |
| RDT&E | Research, Development, Test, and Evaluation |
| RFID | Radio Frequency Identification |
| S&T | Science and Technology |
| SCOR | Supply Chain Operational Reference |
| SecDef | Secretary of Defense |
| SDDC | Surface Deployment and Distribution Command |
| SOA | Service Oriented Architecture |
| SOEDE | Single Operating Environment for Distribution Enterprise |

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|------------|--|
| STOL | Short Take-Off and Landing |
| TAA | Tactical Assembly Area |
| TACC | Tanker Airlift Control Center |
| TAV | Total Asset Visibility |
| TCC | Transportation Component Command |
| TCJ5 | Strategy, Plans, Policy, and Programs Directorate |
| TCJ5-AS | Analysis, Simulation and Technology Branch |
| TES | Transportation Execution System |
| TPFDD | Time Phased Force Deployment Data |
| TRANSCOM | Transportation Command |
| TSV/HSV | Theater Support Vessel/High Speed Vessel |
| T3P | TRANSCOM Transformation Technology Plan |
| UMO | Unit Mobility Officer |
| USD(AT&L) | Under Secretary of Defense for Acquisition, Technology & Logistics |
| USD(C) | Under Secretary of Defense (Comptroller) |
| USTRANSCOM | United States Transportation Command |
| WIM | Weigh-in-Motion |